

AIR TRAILS

JUNE 1950

35 CENTS

Pictorial



Gliding with a French accent

See page 24



A "small" check list for airplane maintenance

Cabin "fasten seat belt" switch.
Propeller de-icer switch.
Carburetor de-icer switch.
Day and night frequency shift.
Auxiliary receiver.
Auxiliary receiver tuning knob.
Transmitter filament switch.
Local distance cutting signal volume switch.
Frequency shift warning light.
Airport and beacon receiver change over switch.
Receiver switch.
Electric panel light.
Landing lights.
Compass and gyro light rheostat.
Instrument panel light rheostat.
Airline receiver volume control.
Electrical instrument control switch.
Dial light for auxiliary receiver.
Starter switch.
Auxiliary receiver power switch.
Volt ammeters.
Lighter.
Booster switch.
Starter selection switch.
Cabin side lights switch.
Cabin dome light switch.
Pilot tube heater switch.
Warning light switch.
Running lights.
Argonne spotlights.
Instrument spotlights.
Electric panel lights.
Compass and gyro lights.
Instrument light.
Ignition switch.
Beacon receiver tuning control.
Windshield crank.
Clock.
Sperry gyro pilot rudder control knob.
Compass.
Sperry bank and climb gyro.

Cambridge fuel analyzer.
Window hand crank.
Fuel pressure gages.
Clock.
Sperry directional gyro.
Cage knob for bank and climb gyro.
Vacuum gage for Sperry gyro pilot.
Gyro pilot bank knob.
Gyro pilot climb knob.
Vertical speed indicator.
Sperry gyro horizon.
Oil pressure gage.
Oil and temperature gages.
Carburetor and temperature gages.
Primer.
Cambridge exhaust gas analyzer junction box.
Kollsman sensitive field pressure altimeter.
Turn and bank indicator.
Gyro caging knob.
Propeller pitch controls.
Manifold pressure gage.
Throttles.
Air speed indicator.
Gasoline quantity gage.
Cambridge indicator current adjustment.
Air speed indicator.
Tachometers.
Flaps position indicator.
Gyro pilot rudder speed control.
Gyro pilot aileron speed control.
Manifold pressure gage.
Eclipse engine synchronizer.
Argonne light.
Gyro pilot elevator speed control.
Rudder tab control.
Selector valve for manifold pressure gages.
Propeller pitch latches.
Kollsman sensitive barometric altimeter.
Fuel tank selector valve.
Elevator tab indicator.
Carburetor heat controls.
Air temperature gage.
Auxiliary beacon volume control.
Distance switch (auxiliary receiver).
Fuel shut-off valve.

✓ 103 instruments and controls are found in the pilot's compartment of an average two-engine transport plane . . . 103 "check points" tell airplane maintenance men of valves to check, of levers and fluid to test — and we call the list small! But it's true.

✓ These many instruments and controls, connected to vital parts of a plane, indicate only part of the responsibilities of the maintenance engineer. Years ago, only a "good mechanic's knowledge" was enough for servicing an airplane. But maintaining the great fleets of airliners today revolves around one word — science . . . the science of physics, strength of materials, aerodynamics, stress . . . and much more.

✓ Realizing this fact, Parks College is providing courses in Aircraft Maintenance Engineering that will give graduates a scientific and practical knowledge of maintenance. It is the purpose of Parks College to give the aviation industry maintenance engineers who know their list of responsibilities is not small. With this knowledge, these men will see aircraft maintenance as a well organized plan that will keep American aviation operating smoothly and economically.

✓ Parks students may concentrate in Aircraft Maintenance Engineering, Aeronautical Engineering, or Air Transportation. After three years, graduates will receive a Bachelor of Science degree from St. Louis University — the oldest university west of the Mississippi river.

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AIR TRAILS

Pictorial

JUNE, 1950 • VOL. XXXIV, No. 3



This month's cover features the Schweizer 1-23, the only high-performance sailplane in production in the U. S. Ship illustrated is owned by E. J. Reeves, president of the Soaring Society of America. It carries on its rudder the insignie of the Texas Soaring Association, which this year is sponsoring the National Soaring Meet that starts July 29 at Dallas.

THE READERS WRITE:

All communications to the Air Trails editorial offices should be sent to Air Trails, Box 489, Elizabeth, New Jersey.

Quiz Picture No. 68

Enjoyed your Naval air "fragment" recognition quiz immensely. Spent almost two hours on it and wound up with a score of 56 out of the 68 possible answers. It is the first pictorial quiz to really offer a challenge.

Got to make a challenge of my own, however, on at least one of your designations. Picture No. 68 is the Douglas R3D, not R5D. The R5D is of course the DC-4, and the R3D is the DC-5.

And your answer on No. 66 with the note that XP2Y-1 had three engines, rather confuses me. I'm inclosing a picture of the XP2Y-1 with the usual two engines. What's the score on this discrepancy? Again, what's the word on No. 33, the L-39-1? Never heard of it. It is not standard Navy designation.

Aviation Cadet W. H. Ragsdale, Perrin AFB, Sherman, Tex.

● The Navy and Marine version of the Douglas DC-5 was originally designated R5D but was later changed to R3D. The three-engine Consolidated XP2Y-1 is a rare edition of the twin-engine type. We believe that only one of its type was produced. The L-39-1 is another of those airplanes little known to the public. It was a Navy and Bell project for investigation of characteristics of sweptback wings in slow-speed flight (subsonic region); the wing was mounted on a conventional F-39 aircraft.

Those Full-Size Plans

As an avid Air Trails reader since the days of Bill Barnes and his Lancer, I want to take this opportunity to tell you that your magazine is still tops in my book. Your full-size plan service is the biggest thing since miniature gasoline engines. Keep up the good work, especially U-control flying scale plans like the DH-4 and the Mooney Mite.

C. Daly, San Francisco, Calif.
(Continued on page 9)

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(Continued from page 4)

Glue for the Crate

In the article on the Orange Crate there is mention of a glue called "Withold White Glue." I would appreciate very much if you could tell me where I can buy this. I have tried many stores and none had heard of it.

Robert Walter, Jr., Philadelphia, Pa.

● "Wilhold White Glue" is the product of Acorn Adhesives & Supply Company, 1011 W. 11th St., Los Angeles, Calif.

Job as Stewardess

As I am interested in becoming an airline stewardess, I would appreciate having the address of Pan American Airlines in order to obtain the physical and mental requirements.

Anne Chaudoir, Alexandria, La.

● Write to Pan American Airways System, 135 E. 42nd St., New York, N. Y.

Earth Inductor Compass

Reading a story about old-time flyers, I ran across an instrument I'd never heard of—the Earth Inductor Compass. Can you explain it to me?

Vitto Bitetto, Brooklyn, N. Y.

● An Earth Inductor Compass is a navigational instrument which does not use a magnetic needle to indicate direction, but depends on the current generated in coils revolving in the earth's magnetic field. It consists of a drum-wound armature with a commutator, similar to that used in a direct-current generator.

The compass is placed in a part of the plane as far away from magnetic disturbance as possible, usually in the tail, and is driven by a small windmill protruding in the airstream. The generator is connected to a course-setting dial and indicator on the instrument board. The pilot sets the desired course in degrees on this, and, theoretically, as long as he keeps on course the indicator will point to zero, but will point to right or left if he deviates.

This type of instrument is no longer in use. One of them was mounted on Lindbergh's Spirit of St. Louis.

Minnow and Midget Mustang

Maybe my eyes are deceiving me or maybe I'm just plain stupid. Would you try to show me some major differences between the Cosmic Wind Minnow and Long's Midget Mustang? They both look like twins to me.

R. C. Mann, Baltimore, Md.

● If you mean the #4 Minnow of 1948, there is little difference in outer appearance between it and the Long Midget, beyond the fact that the Long job has a slightly smaller span, somewhat deeper fuselage, rounder rudder and different wing configuration, which also features flaps. Compared with the 1949 rebuilt Minnow, it is quite different. Compare 3-views in Feb. issue.

W/L of the Cloudster

If Air Trails Cloudster really does have a W/L of 9 lbs./sq. in. as you say, it really does have guts. To carry the absurdity to an extreme, you should have Cal Smith revise his dwg to show a mean chord of .426 in. With an AR of 9,594 it should have little induced drag, but I'm afraid the wing area of 1.205 sq. ft. would require more hp.

Jim McClelland, Independence, Kans.

● The National Model Meet's 1949 director has us but good. The W/L should have read 9 lbs. per sq. ft.

CAP and Reserve Too?

I am wondering if a certain fact will hinder my eligibility for membership in CAP. Presently, I am a junior at Fordham University and a senior ROTC student, being eligible for a commission in the active reserve this June. I am in the anti-aircraft artillery but have an opportunity to receive my commission in the Army Intelligence Corps. Would it be possible for me to become a member of CAP, in any capacity it so desires to put me, and still retain the Active Reserve commission?

Joseph Vedella, Fort Lee, N. J.

● There is no conflict between being a CAP Senior Member and holding a Reserve Commission. Many CAP Senior Members presently are in the active reserves. Also, many reserve officers receive credits toward their reserve service from the Armed Forces for certain duties they perform in the Civil Air Patrol.

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Showcase

See your hobby shop for the items shown here. Both the price and the specifications are subject to change.

You're a lot older than we thought if you can remember the \$2,500 1905 White Touring Model E Steamer that Fador Mfg. Co. has just released in kit form. But young or old, you'll have a lot of fun putting this auto together. The White has a wheel base of 5 13/16 inches. Sells for \$2.95. Fador's Smallster antique auto kits are designed for easy step-by-step construction, contain precision built die-cut and die-cast parts. . . . A new fuel, designed for top performance in the OK Cub and all "OK" engines is now being made by the Herkimer (N. Y.) Tool & Model Works, manufacturers of the OK engine line. The new glow mixture is a compounded methanol-base fuel, heavily fortified with nitrates and has the proper lubricating ingredients added. While specifically designed for the OK motors, the new fuel will also give high performance with other make engines having a similar compression ratio, according to Herkimer representatives. The new OK glow fuel is claimed to be ideal for breaking-in purposes and high-speed operation. Not critical, it is said to operate over a wide range of engine speeds. Priced at 75c pint. . . . Scientific Model Airplane Co. (now at a new address: 113 Monroe St., Newark 5, N. J.) comes through with a carved fuselage U-control model to retail at \$1.50. Designed for the small-bore engines, the new job is called the "Little Devil." Wing span is 18 inches, length 12 inches, wing area 62 sq. inches; weight 4 oz. Will take engines from .02 to .09. Pre-fabbed, all parts are precision cut and shaped. . . . Suppose you spotted that back cover ad of last issue: new O&R .33 cu. in. disp. rotary valve g-p'ed Red Head selling for \$12.95, or as ignition for \$13.95. Has same mount dimensions as O&R 23 and 29. . . . Look for some big news from Victor Stanzel & Co. Mr. Stanzel showed his "Mono-Line," single line elevator control, at the recent model industry trade show—also a 24" jiffy-built Class AA and A sport model featuring Mono-Line control. . . . Latest addition to the Froome line of tanks is the #19 for .09 motors. Made of rust-proof tinplate, it is 1/2 in. deep, 7/8 inch wide, 2 in. long. For U-control, priced at 75c. . . . Seal Sure Chemical Products announces added refinements to its Hot Fuel Proofer. Reports it flows out into clear, glass-smooth coat as impervious to hot fuels as glass itself. Good adhesive qualities, maker says—it will not bubble, crack, chip or peel. Repairs to model are simplified since cement or dope may be applied over the proofer without chemical reaction. Four oz., 45c; 2 oz., 25c. . . . Dumas Products advises that it has discontinued its 1947 Chris-Craft 46 ft. Cruiser boat kit in favor of the new 1950 Chris-Craft 46-footer. New model has simple standard Vee hull, better plans and parts, gold decals, plus other innovations. Kit sells for \$6.50. Plans show model as enclosed bridge or flying bridge cruiser. Length 26 in.



White Steamer

OK Cub
Glow Fuel



OK Cub
Glow Fuel



Little Devil

From Froome



Seal Sure



Seal Sure

AIR TRAILS PICTORIAL

Showcase

Try your nearest hobby shop for items presented here. Write the manufacturer if you can't find it.

T-16 is the designation Comet Model Hobbycraft has given its new Taylorcraft kit. This is a prefabricated all-you-do-is-assemble-it job with finished balsa wing, ready-cut fuselage sides and formers, 1-piece formed, shockproof landing gear, shaped balsa tail pieces and plywood firewall. Wingspan is 35½ inches. Takes A, B and small C engines. Priced at \$2.95. . . . The latest addition to the Minnesota Engine Works' family of model jet engines is the M.E.W. 307 jet. Utilizing big engine design and construction, the 307 is 26 inches long with a diameter of 1 inch and thrust of 1 pound. Has flame arrester to keep flames away from the valves. Jet can be started with any flame type



Comet T-craft

igniter, eliminating ignition system. Compressed air that is necessary can come from auto tire or inner tube. Once started, compressed air supply is disconnected; only gas tank then needed. Built-in mounting lugs are feature; weight is 8 ounces. Unit is priced at \$15.00. . . . "Perfect" modelplane accessories are newcomers distributed by Kramer Brothers. You can spot them on



Perfect is the name

the Perfect display unit which is made up of 36 cellophane packages. These include battery cord sets, line connectors, swivels, eyelets and similar items. Each package lists price and size of item and contains instructions for its use. . . . When you find yourself in a nautical mood you should try your hand at assembling Marine Models' new Sailfish boat. Every part is die cut from mahogany veneer. Craft has hollow hull; kit contains fittings, sails and spars. Good for group racing, Sailfish is called one of the fastest model boats afloat. Its length is 17½ in., beam is 4¾ in., height is 22 in. Kit price, \$1. . . . Señor Puddlejumper, si si, is the south-of-the-border title given to Berkeley's new stunt trainer. Berkeley Bill describes it as



Fast Sailor

the perfect model for the beginner in control line flying. Uses box-type fuselage construction and built-up wing. Light and rugged, it was designed to take novice's "mistakes." Wingspan is 25 inches; has been flown with engines from .074 to .23. Prefabbed kit with die-cut balsa and plywood parts, shaped leading and trailing edges for



Si, Señor

wing, all U-control hardware, rubber wheels. The price, Señor? But a few pesos—in American money, \$1.95. . . . Antique auto fanciers will be glad to know that the 1902 Pierce Motorette is now available in kit form made up by Authentikit Vehicles (Philadelphia's B. Paul passes on this info to us). Ready to assemble, it comes for \$2.50. . . . We've had quite a few requests for a source of the 1949 Thompson Trophy race winner in kit form and we're happy to point out that Miniature Aircraft Corp. has a deluxe U-control kit of 41 inch span for B and C motors. Kit features are 2½ inch scale rubber tire aluminum disk wheels, 4¼ inch aluminum cowl, molded cockpit enclosure, other items, \$6.75.



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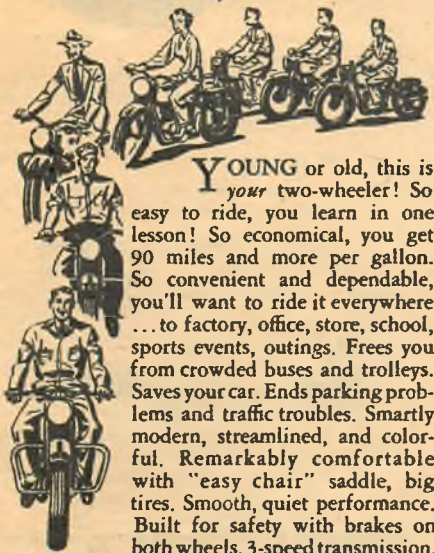
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Sailplane Parade

Highlights and news of motorless flight activities and soaring clubs throughout the United States

Glider vs. Sailplane. Q. When is a glider not a glider? A: When it's a sailplane. The name glider has been applied loosely to all motorless craft when actually there is a vast difference between it and a sailplane. A glider is a motorless airplane earmarked by short stubby wings and a bulky fuselage with a minimum of streamlining. Its span never exceeds 40 ft., aspect ratio is less than 10, and its glide ratio in the vicinity of 15 to 1. The main purpose of the glider is to train soaring pilots.

The sailplane, on the other hand, has a long slim wing, a streamlined fuselage with enclosed cockpit and is as clean as a whistle. Its glide ratio can be as high as 30 to 1, and the sailplane is capable of long sustained flights. (World distance record for a sailplane is 465 miles in free flight.) Recently there has appeared another type of sailplane, of small wingspan and overall dimensions which boasts a high cruising speed. This type, though somewhat inferior in sinking speed, is especially suitable for distance flights under strong thermal conditions. Although its capabilities are not as yet fully explored, those in the know predict for it a bright future.

Thus when mentioning the word *glider* in this column we mean just that, the training type motorless aircraft. When we refer to *sailplanes*, we are speaking of those graceful streamlined bird-like machines.

Airline Soarers. A number of airline pilots are enthusiastic participants in the sport of soar-

ing. Going through the membership roster of the Soaring Society of America, we see no less than seventeen of the big-plane boys who spend a busman's holiday wheeling around their sailplanes in ascending air currents. From American Airlines come John Booth, Fred Barnes and William L. Jones; Capitol Airlines boasts of the thunderstorm pilot, Paul Tuntland; Eastern Airlines has Hasson Calloway, J. Shelley Charles, Francis B. Compton and Elmer Reed; Pan American Airways—L. M. "Bud" Holloway, Steward Doe, Richard Johnson (now at the Engineering Research Laboratory of Mississippi State College), and Kimball J. Scribner, National soaring aerobatic champion.

Representing Trans World Airlines is Loren V. Petry, and pushing United Airlines transports are soaring fans Joe Irvine, Andrew Madsen and Alvin D. Yates. Frederic Brittain, Southeastern Soaring Champion, until recently flew a Grumman Goose for British Guiana Airways. All the boys say that soaring has greatly helped them in their profession. On numerous occasions they were able to save gas without decreasing cruising speed of the airliner by applying their soaring knowledge to transport flying.

Oldest Soaring Pilot on the active list in U. S. is Walter J. "Pop" Krohne of Maitland, Fla. Pop is 62 years old, a vigorous and energetic man and just about the most assiduous sailplane pilot in Florida. A long-time powerplane pilot, he took up the sport at the Gliding (Continued on page 91)

Advance Word

So You Know Your Planes? In the March issue Henry Clark lined up a lot of commercial aircraft, selected certain portions of same and dished the affair up as a group of 66 mini-photos. One that's brought the biggest batch of mail was #63, identified as the Convair air-car roadable. Robert P. Straub, New Rochelle, N. Y., was among those who wanted to know if that plane wasn't Bill Stout's experimental roadable plane and not Convair's?

Fact of the matter is the plane (shown flying in top photo, below) was called the Spratt controllable wing and was test flown by Consolidated Vultee's Stout Research division, Dearborn, Mich. George Spratt, design specialist at that time for CV's SRD, is shown flying an early version of the controllable wing (1934). When picture was made Mr. Spratt could not fly a conventional type aircraft!



On the Spratt-Stout-Convair (you name it) a steering wheel was used to take care of all controls by changing the position of the movable wing mounted on a universal joint. The other Convair venture into the roadable airplane field was the Flying Auto, designed by T. P. Hall. CV decided not to continue this project and turned the design over to Hall.

The Halfway Mark. AT's July issue (out about June 8) means that the year will be almost half over. Golly. Well, there are a lot of nice items on the menu: Doug Rolfe and his development of the "aeroplane" prior to the Wrights, for instance. And a fine report on the postwar Flying Flea airplane. Refined, refinished with a neat reat pleat—some bipe. For those hoping for a lifetime career in aviation, the first in a series on specific jobs and how to prepare for them. Quite helpful.

Some data on model fuels that should prove very useful. And lots of fine models: a small free flight that's long on looks and performance; the many-time Mulvihill trophy winning outdoor stick h.l. ship by Bob Bienenstein of Detroit; a couple of control line lovelies—can we keep you guessing on them?

Model Record Review. Next month we expect the feature to return after a short absence; we were waiting for the national record listings to be brought up to date. Some contest directors have an unfortunate habit of not properly reporting mark-shattering flights to Washington (AMA).

—The Editors.

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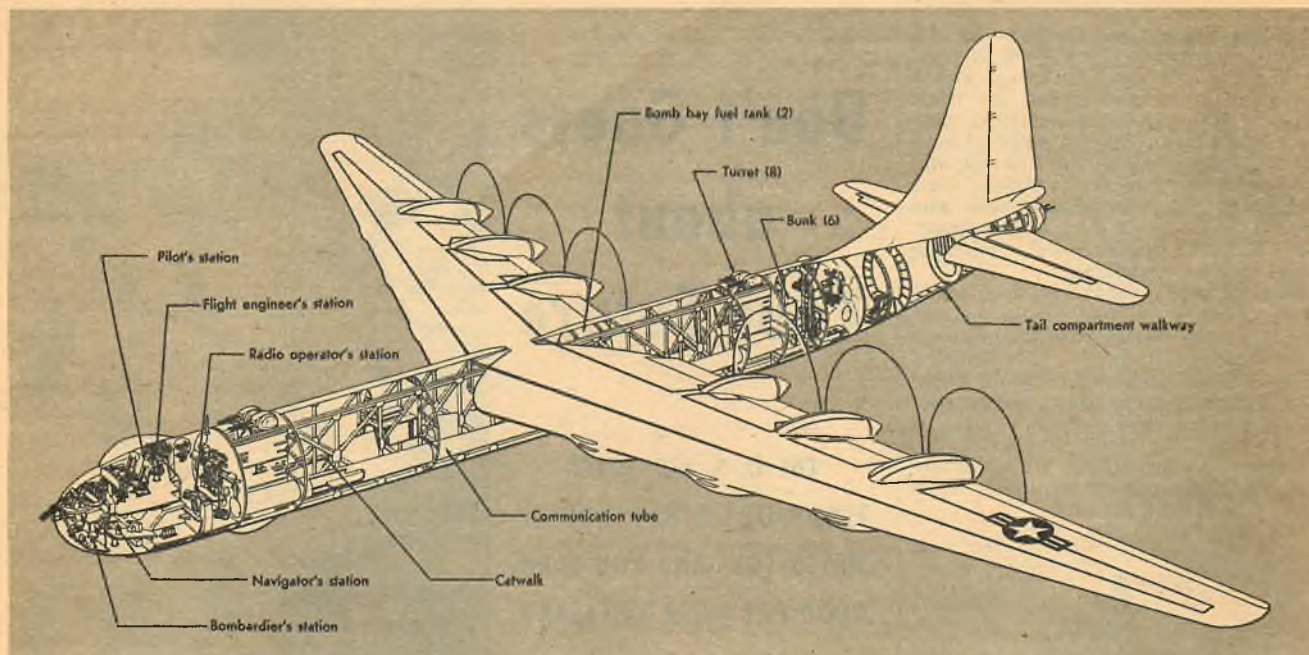
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Highlights



● The "inner sanctum." First cutaway drawing of the Convair B-36 bomber to be released. It shows the plane's general arrangement

including twelve of the sixteen 20-mm cannon as well as the five bomb bays capable of carrying a bomb load up to 84,000 pounds.



● Latest British anti-submarine aircraft, the Fairey 17. Powered by the co-axial Double Mamba gas turbine engine driving contra-rotating props. Engine capable of developing 3500 hp.



● The Breda BZ.308, long-range Italian transport capable of carrying 55 to 80 passengers. Powered by four Bristol Centaur engines of 2400 hp each. Span 136 ft. 2 in. Speed 300 mph.



● Bellanca Cruisemaster. This is a faster and larger version of famous Cruisair. Has 190 hp Lycoming, hydraulic flaps, Hartzell Hydro-Selective prop. Top speed 185 mph. Lands at 43 mph.



● Artist's conception of forthcoming turbine-powered Convair-Liner. General Motors recently purchased a standard Convair for installation of Allison turbo-prop engines of 2750 hp each.



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The current "Graduate Employment Report," compiled by the *Graduate Placement Department* of Northrop Aeronautical Institute, lists hundreds of Aeronautical Engineering graduates and the employers with which they were placed over an 18 months period. Here is a printed record of the constant demand for *Northrop*-trained men throughout all *Aviation*.

Aeronautical Engineering may be YOUR answer

The "Employment Report," described above, and the big, heavily illustrated *Northrop* catalog will give you abundant details for consideration of *Aeronautical Engineering* as a career field. Here is full information on opportunities, types of duties, qualifications, and training.

**Read these typical reports
of graduates* now profiting
from their Northrop training**

- *Paul B.*: "I am employed in Rocket Motor Design."
- *K. A. S.*: "I went to work the first Monday after graduation as an Experimental Technician in fuel cells."
- *Edward W.*: "I was hired immediately upon graduation. During the two years I have had several raises and a promotion. I am now working directly with the Project Engineer, in the new airplane Project Group."
- *Frank M.*: "Gene M. and I have been here at the Proving Ground for three weeks now. We have seen missiles and the V-2 rocket fired." (These two men were assigned to guided missile research as their first positions after graduation from Northrop.)
- *Douglas E.*: "I am in the Stress Group. My first job was to design the loading jigs for applying the torque loads in the (name of aircraft) static test."
- *Melvin H.*: "N.A.I. has an accurate idea of what is required of the new engineer. The practical end of our training has shown itself in a number of ways. Those of us with our technical school background have a definite edge in our work."
- *Allen B.*: "A wire offering immediate employment arrived a week after the interview. I am in Engineering Design."
- *Robert B.*: "I wanted to let you know how much I appreciate your help in securing this position. I work in the Missile Flight Test and Analysis Department."

*Names abbreviated here out of respect for personal privacy. Record on file in N.A.I. Graduate Placement Department.

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Arctic Rescuer: The Piasecki H-21 all-metal 20-passenger helicopter is being billed as "the world's first large-scale Arctic rescue helicopter" since the recent USAF competition which it won as a rescue vehicle. Some 25 H-21's will be built for this purpose. The greatest significance of the competition, however, will probably be not this order *per se*, but the head start it will give to Piasecki, costwise, in the commercial transport 'copter field.

Under its civilian designation, PD-22C, the H-21 has been proposed for commercial air mail, cargo and passenger-carrying use (along with 'copters by Bell, Sikorsky and McDonnell). The H-21 could carry 15 passengers and baggage in inter-city bus type accommodations and as many as 21 passengers commuter style, similar to subway seating, in short-haul service.

For its Arctic service, the big 'copter will feature a specially designed "omni amphibious" landing gear with a choice of wheels, floats, or skis, to permit landing on snow, ice, water, marsh, tundra, or land. It will be equipped with a swinging hydraulic hoist for rescue operations. Its complete power plant package will be quickly removable as a unit, and—an important feature—its Wright engine is the same as that used in the Grumman SA-16 amphibian, the other member of the air search and rescue team.

Reconnaissance 50: A new model of the famed Superfortress, the RB-50B, has made its 'bow from Boeing's Wichita plant, complete with cameras, improved radar, aerial refueling, and weather recording instruments to make it USAF's most modern aerial photographic and weather reconnaissance laboratory. The new Superfort will perform missions previously handled by modified B-29's, at faster speeds and higher altitudes. The RB versions are new B-50's turned out at Seattle, then flown to the Wichita plant for installation of special equipment. In order to expedite changes, the big planes are cut in half, the tail sections going into one modification line, the forward sections into another, work on both being accomplished simultaneously. Intensive flight testing is scheduled to prove the new Superfort's ability.

Turbo-prop Boom: The boom may be starting in turbo-prop engines. While Allison is busy converting its Convair-Liner to prop-jet in time for a summer tour, Boeing has announced that turbine-propeller power plants for both the Stratocruiser and its military counterpart, the C-97A Stratofreighter, are "now under development." Boeing engineers estimate they could have a "Turbocruiser" in the air in less than a year, without extensive modifications.

Turbo-props for the B-36? A major modification of the Air Force's heavy bomber program may result from a study now under way to determine the possibilities of converting the B-36 to turbo-prop power. Under the plan, four new turbo-prop engines would replace the big bomber's six piston engines, and a new sweptback wing would be installed. If studies show that these and other changes could give the B-36 a speed of 500 miles an hour, ceiling of 50,000 feet, and range of around 10,000 miles, the Air Force may postpone or drop entirely development of the Boeing XB-52 jet bomber which had been slated as a successor to the B-36.

A major factor behind the modification move is the question of cost and available appropriations. Cost of a B-36 now is about \$4,700,000, while estimates place the B-52 price tag at \$8,000,000 to \$10,000,000 apiece for the first sizable production order, plus development costs.

Hook, Line and Target: New high-speed target-towing apparatus that is being installed in 14 North American B-45 jet bombers will soon be giving USAF fighters a fast target to practice on. The device is an automatic reel and cable, hydraulically operated from the tail gunner's position, by which a target glider can be reeled out behind the B-45 and towed at jet speeds at sufficient distance to permit use of live ammunition. Such tests have already been successfully run at Edwards AFB.

Escape by Capsule: Late this year the Navy plans to test in actual flight a new pilot ejection mechanism more advanced than any yet tried. It is a breakaway cockpit unit which would eject the pilot in a completely enclosed, pressurized and insulated capsule. The capsule is attached to the fuselage by clamps and can be blown loose in emergency by a Jato device operated by a lever which the pilot pulls. Three stabilizing fins prevent the capsule from tumbling, and it is lowered by a large parachute. The unit will float and can be used as a boat for pilots forced down at sea. The pilot has an out if necessary—he can leave the capsule through an overhead canopy, using his personal 'chute in case anything happens to the capsule's.

Sofar, So Good: A new system devised by the Navy for locating planes downed at sea—called SOFAR (Sound Fixing and Ranging system)—is reported to be capable of determining within one mile the position of a downed plane or surface craft 2,500 miles at sea. The distressed craft drops a 13-pound bomb into the water, and sound waves from the bomb indicate its location to the SOFAR station on shore. Automatic recording equipment makes constant watch by shore stations possible.

Designed for Nighttime: The Navy's new F3D twin-jet Douglas Skyknight fighter will be one of the earliest jet night fighters designed strictly for that purpose from its inception. The Skyknight was conceived in 1945 for nighttime operation against high-performance bombers expected to be in evidence in the '50's. The specifications were exacting. Navy wanted a two-place, side-by-side cockpit arrangement, plus the space and weight for electronic night-fighting equipment, plus high speed and an operating altitude of 40,000 feet. Tests during the past year indicate that the Skyknight meets these requirements.

Aeromedical studies had shown that it would be impossible to bail out of a plane of this performance in the usual manner, and the Skyknight's designers have met this problem not with an ejection-seat arrangement (which would have added objectionable weight and made pressurization more difficult) but with an escape tunnel through the floor, down which the pilot can slide to drop out beneath the plane. The system has recently been tested extensively with actual bailouts and is considered not only successful but a great improvement over jettisonable seats for aircraft of the Skyknight's speed range.

New Airliner: A new twin-engine airliner, the Martin 4-0-4, will make its entry into air transport service next year. Eastern and TWA are both buying the ship as a replacement for their present twin-engine equipment. A total of 65 have been ordered. The 4-0-4 is a 40-passenger improved and modernized version of the 2-0-2 which has been in use on one U. S. line for the past two and one-half years. The new model, Martin says, will be the first production airliner designed and stressed for conversion to turbo-prop engines.

PLYMOUTH ANNOUNCES EVENTS, PRIZES IN 4th INTERNATIONAL MODEL PLANE CONTEST

127 Trophies and \$7000 in Savings Bonds await winners in
"Olympic Games of Model Aviation," August 14 through 21, at Detroit

Again, this August, the finest model plane facilities in the Detroit area will be the meeting grounds for 500 top model aviation enthusiasts of the world.

Nine hard-packed speed, stunt and scale circles will be used for four continuous days on Belle Isle Park.

Almost 2½ square miles of expansive Selfridge Air Force Base, coupled with exceptional retrieving facilities, will be available for free flight modelers.

Indoor events will be flown in Michigan's State Fair Coliseum (275 feet long, 125 feet wide, with a 65-foot ceiling), where only contestants, officials and members of the press will be allowed to enter.

Sponsored by Plymouth in conjunction with the Aero Club of Michigan—sanctioned by the Academy of Model Aeronautics—the big show will include classifications for three different age groups as follows: FRESHMAN—11 years old or under, but not yet 12; JUNIOR—12

to 15, but not yet 16; SENIOR—16 to 20, but not yet 21. (Ages as of July 1, 1950.) Here are the 40 events scheduled.

INDOOR RUBBER (5 events)

Indoor Stick for Freshman, Junior and Senior.

Indoor Cabin for Junior and Senior.

OUTDOOR RUBBER (5 events)

Outdoor Stick for Freshman, Junior and Senior.

Outdoor Cabin for Junior and Senior.

OUTDOOR GLIDER (2 events)

Towline events for Freshman and Junior.

FREE FLIGHT GAS (10 events)

Classes ½A and A for Freshman, Junior and Senior.

Classes B and C for Junior and Senior.

CONTROL LINE SPEED (10 events)

Classes A and B for Freshman, Junior and Senior.

Classes C and D for Junior and Senior.

CONTROL LINE FLYING SCALE (2 events)

Any type model. Class ABCD for Junior and Senior.

CONTROL LINE JET SPEED (2 events)

Jet Class for Junior and Senior.

CONTROL LINE STUNT (3 events)

Class ABCD for Freshman, Junior and Senior.

CONTROL LINE TEAM RACING (1 event)

Class B for Senior.

All winners of first, second and third places in each age group will receive gleaming trophies. Also, first place winners will get \$100 U. S. Savings Bonds; second place winners will get \$50 Bonds; and third place winners \$25 Bonds.

In addition, beautiful permanent trophies will be awarded to high point winners . . . for top speeds in jet events . . . and to high point scorers in stunt and flying scale events.

Contestants will be chosen on the basis of records made in AMA-sanctioned Plymouth dealer contests.



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Plan now to enter. Your nearest Plymouth dealer will be glad to give you complete details, rule books and entry blanks. Entries close July 16, 1950, so see your Plymouth dealer now!

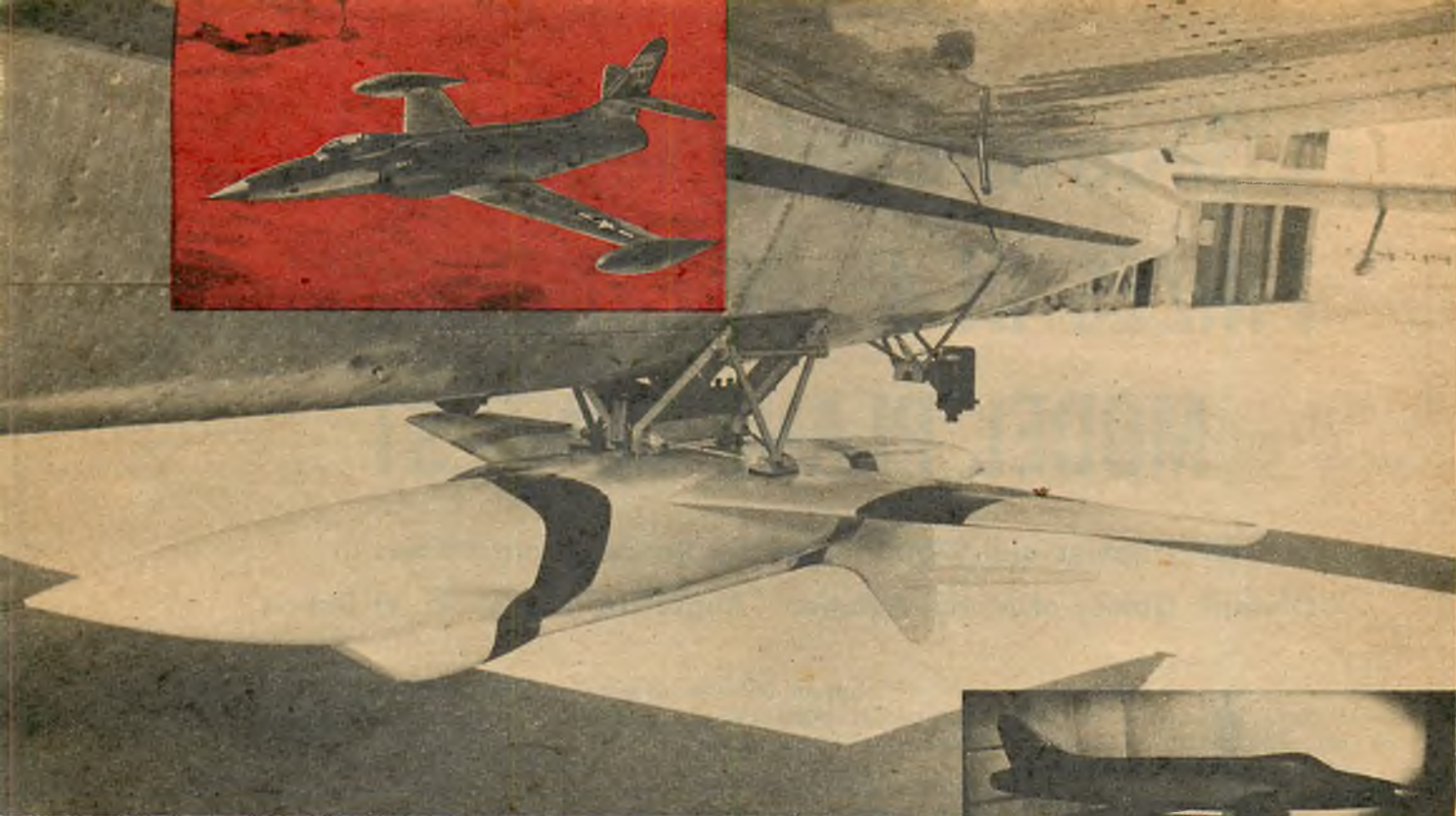
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The F-90, Lockheed's new long-range penetration fighter which the Air Force reports weighing about the same as the DC-3, "flew" long before the airplane became airborne. Amazingly accurate scale models built of steel, lead and plastic were dropped from the underside of an F-38, flying seven miles above the Edwards Air Force Base at Muroc Dry Lake in California. Model destroyed itself upon impact.

As each model dropped faster and faster, until it reached supersonic speed, it was subjected to control changes. Motion picture cameras and telemetering recordings caught every change in its flight path. Months before the full-scale F-90 took off on its first flight test piloted by Tony LeVier, its performance was accurately predicted to within one percent by use of these 910 lb. models.

● Clockwise from top: F-90 (insert); 1/6 scale drop model under F-38 belly, note camera; autopilot checked, telemetering units in front; wing flutter test; readying drop models; alignment of tail section.



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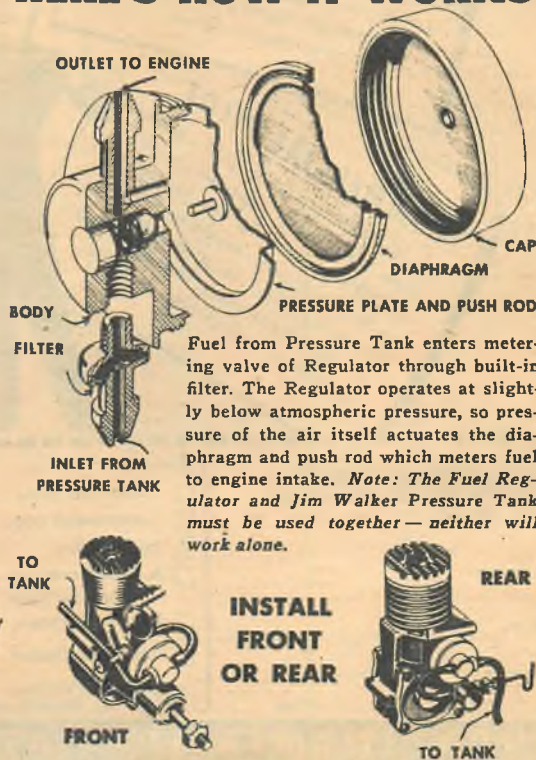
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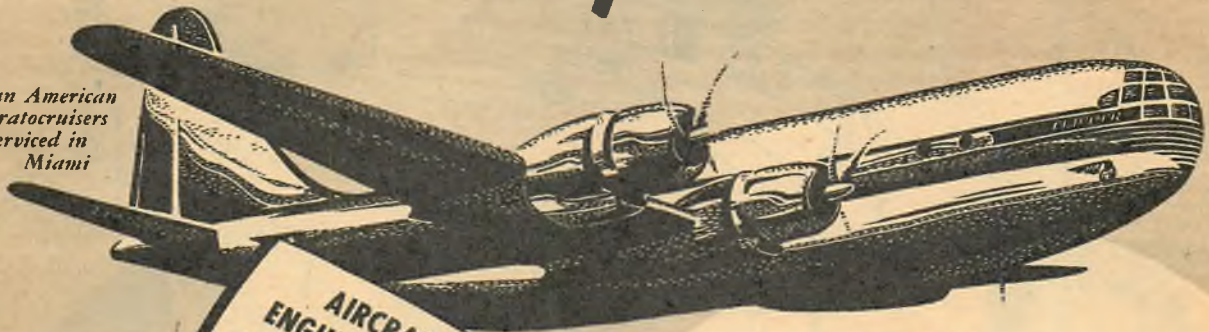
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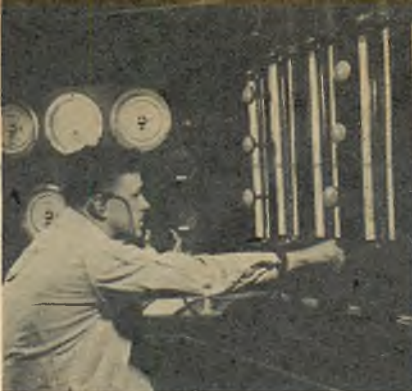
AIR TRAILS

JUNE, 1950

Your Job in Aviation

It can be any one of a hundred or more different tasks because there's a lot more to aviation than sitting behind the control wheel in a cockpit. The industry which has had its ups and downs today offers a variety of jobs to those willing to study and work and always learn

YOUR JOB IN AVIATION



TAKE a good look at these people.

Notice something unusual? They're all working in aviation jobs, or at a task that serves aviation, yet not one is in a cockpit behind the controls of a plane. These photos point up the fact that it requires between 20 and 30 individuals at work on the ground in a variety of interesting jobs to keep one two-engine plane in the air.

An outstanding feature of aviation is the variety of exciting careers it offers to properly trained individuals. Let's look into some of those careers.

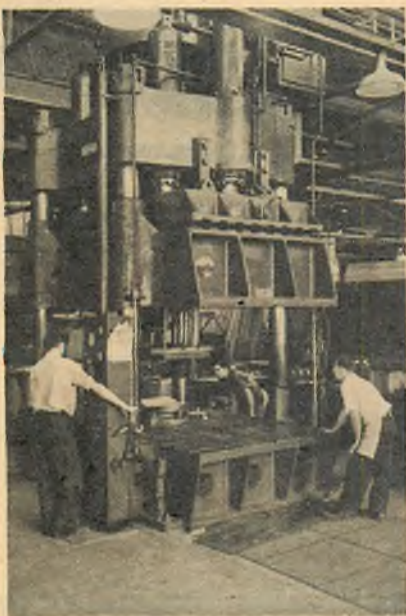
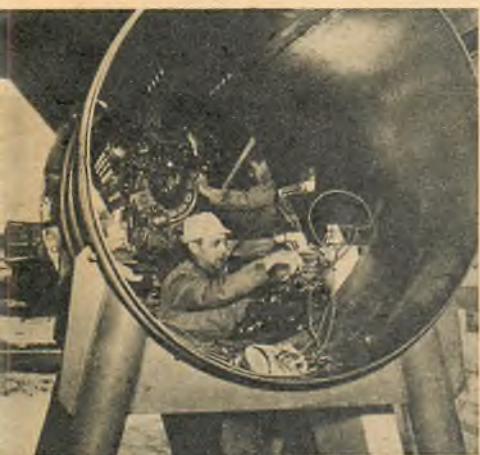
Aviation jobs fall generally into four main categories: you can work with the airlines, in aircraft plants, at flying fields and with the government. While production requirements may change from year to year and the private side of aviation vary to some degree, the airlines and the federal government continue to offer more and more jobs. Come war or peace, transportation by air is important.

It's here to stay on an ever-expanding basis.

Today the airlines employ 78,000 persons. That's up almost 10,000 from shortly after the war. The Civil Aeronautics Board recently reported to Congress that the state of the airlines was very good indeed and within five or ten years practically all who go 1,000 miles or more will be traveling by air.

What CAB didn't say, and might well have, is that the helicopter and convertaplane will some day—and that day is not too far in the future—give the short haul busses and trains a real fight for their passenger business. As aviation loses some of its glamor and settles down to doing a multitude of everyday jobs in routine fashion, as more passengers and more packages and more flowers and more dresses are hauled, great will be the need for trained personnel, not only in the air but on the ground.

Scheduled lines are going after





travelers on the basis of dollar-for-dollar competition with other forms of travel. Last year more than 25 million passengers rode the world's airlines; across the Atlantic alone more than 11,000 trips were flown—and 300,000 passengers were carried. The incoming and departing plane schedules in newspapers at the international jumping-off points occupy far more space than ship schedules ever did.

Last detailed figures on airline personnel were compiled for 1948. These showed the scheduled lines had 60,416 employees. The classification breakdown is of interest: pilots and co-pilots, 5,307; stewardesses, stewards and other flight personnel, including flight engineers and navigators, 3,350; meteorologists and dispatchers, 2,612; mechanics, 16,428; other hangar and field personnel, 9,222; office employees, 21,396; all others, 2,101. The same proportion will hold good during the expansion ahead. The young man blueprinting his career might well consider

that proportion along with other factors in seeking airline work.

The aristocrats of airline employment are, of course, the pilots. They earn \$8,000 to \$12,000, their hours are not hard, and, of course, their job is the most attractive one of all to those enamored of flying. There are 7,762 men on the CAA's pilot rolls who have Airline Transport Ratings. At present, there are 6,800 employed by the domestic and international airlines, and an estimated 3,000 with commercial pilot certificates employed by the large and small irregular carriers.

On irregular carriers, using large planes, there are now 96 with operation certificates listed by the CAA; an estimated 150 pilots are employed. Most of these men have airline transport ratings, although only a commercial pilot license is required. They lead interesting lives, earn salaries only slightly less than those of airline pilots.

Flying (Continued on page 90)





Vol à Voile - GLIDING

Innocents Aloft might be the title of

By **EVERETT R. GREENBAUM**

LAST year, I studied in Paris under the G.I. Bill. When the miseries of a heatless winter were past and the lovely intoxication of a Paris springtime set in, I began to miss flying. I went to the Service de l'Aviation Sportive in Trocadero to inquire about *vol à voile*. There, they told me that it was possible for foreigners to soar but that a special permit had to be obtained from Le Ministère de l'Air.

The next afternoon, I went out to the Air Ministry in Issy. It was part military, part civil. No one there understood my French. It is the sort of French which the French call *vache Espanole*: Spanish cow. While wrangling with an official who thought I was trying to enlist in the French army, a

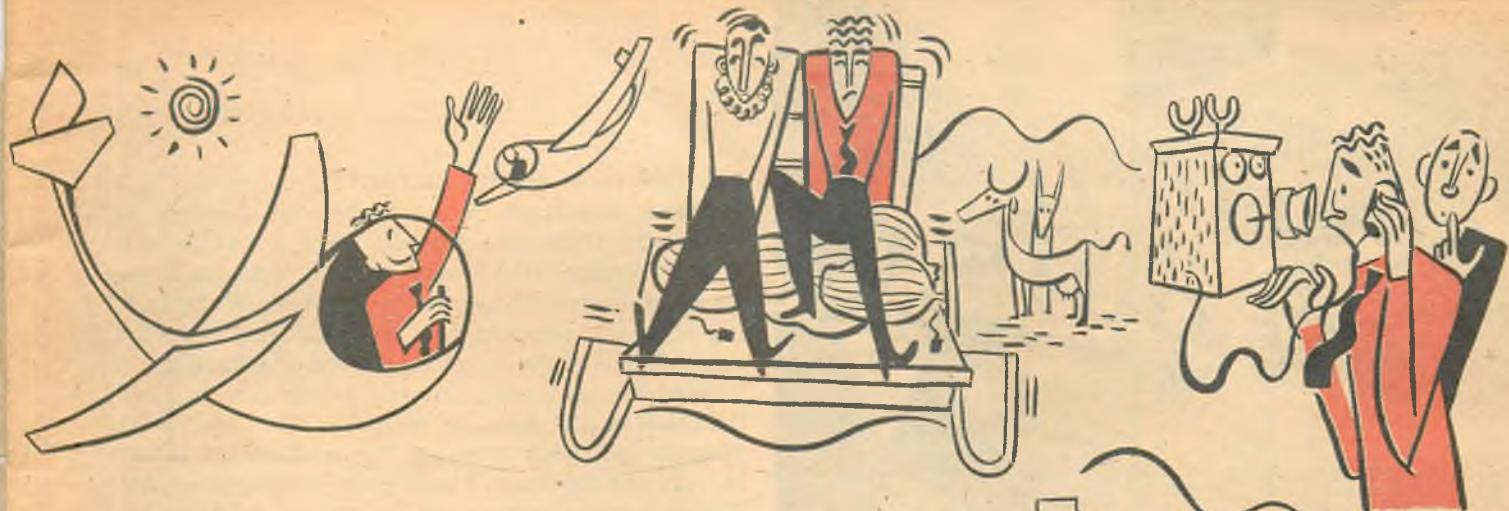
young British woman stepped up. She explained that she was the wife of a French air force pilot and offered to help me.

In a few minutes, we were in the office of Monsieur le Directeur. He asked questions. No, I had never flown a glider. Yes, I had been a military pilot in America. Yes, I was in excellent physical condition. Finally he said that I could soar at certain bases which were far from Paris.

Very discouraging. I couldn't leave Paris for more than half a day. If I missed my classes at the Sorbonne, the American Embassy would cut off my subsistence allowance. I thanked M. le Directeur and went off to have an aperitif with the English girl.

Then one day I met Guy Marchand, a fiery little fellow with a red beard. He had been an F.F.I. fighter and was now making





WITH A FRENCH ACCENT

this tale of special interest to all ex-Navy SBD'ers

speeches in Metro stations on behalf of Garry Davis, the world citizen. He had recently taken a little time off to set a world's endurance solo soaring record of 40 hours.

Sitting under the awning of the Café Dôme in Montparnasse, Guy mentioned that he was going to Beynes the next day for *vol à voile*. I told him about my abortive visit to the Air Ministry. He suggested that I come with him to Beynes, which was not far from Paris.

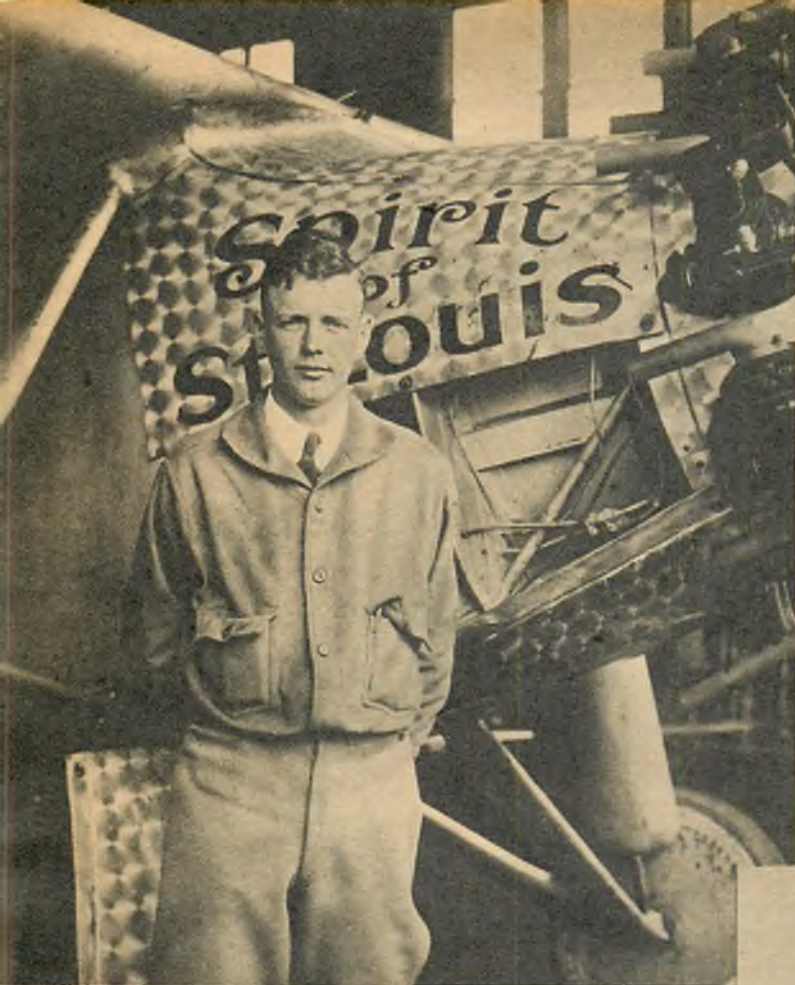
The following day, after my classes at the Sorbonne, I met Guy at the Gare des Invalides. We caught the train for Versailles, and there waited by the road in front of the station. After a while, a Simca pickup truck came along and stopped for us. Inside, sitting on plank benches, were several young people; soldiers, students

and a couple of girls. Guy shook hands all around in French fashion. One of the soldiers asked me if I were English. When I told him that I was American, he seemed relieved. *Ah, Américain! Très bien!*

After a ride of twenty minutes or so through the tidy countryside marred only by the Nazi-bombed ruins of the Military Academy at St. Cyr, we arrived at the Beynes Soaring Center. It was a neat little airport surrounded by soft, green hills.

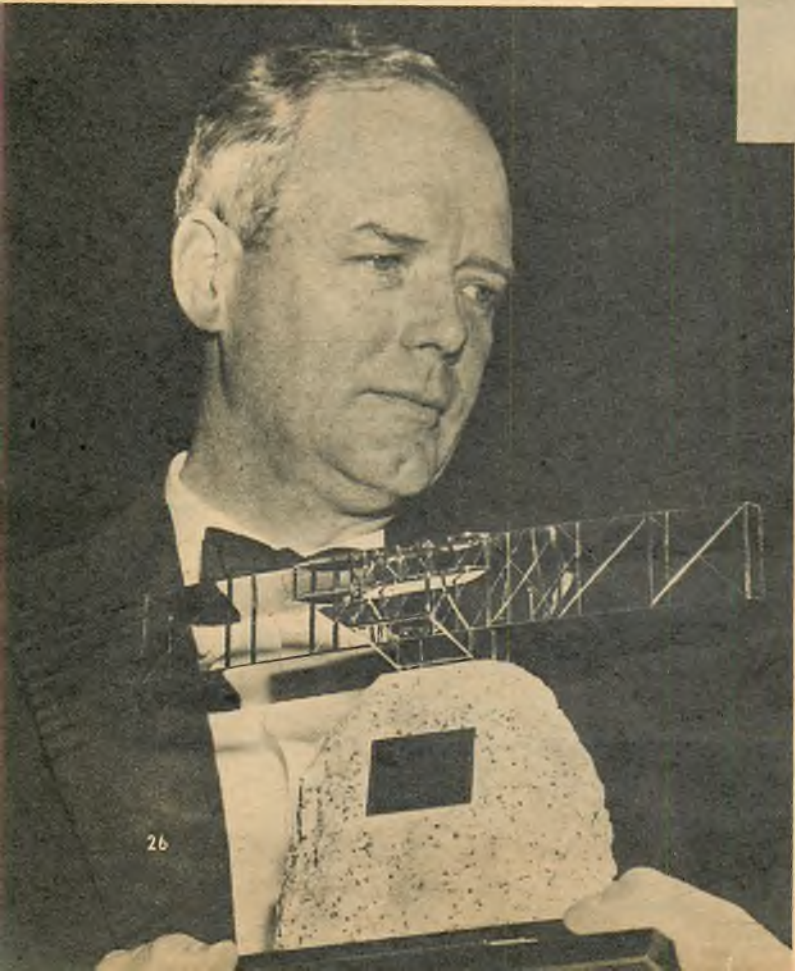
Guy took me into the office and presented me to the Chief Pilot, Monsieur Paul Lépense, a tanned, handsome fellow. He explained that he had been sent to Wichita, Kansas, the preceding year to compete in the international soaring meet. When I told him how I had been discouraged by M. Le Directeur, he (Continued on page 83)





● May 12, 1927: Charles A. Lindbergh, former Army Air Corps flyer and civilian airmail pilot, at Curtiss Field, L. I.

● Dec. 17, 1949: For "significant public service of enduring value to aviation," Wright Brothers Memorial trophy to CHL.



IN THE early months of 1902 there occurred two events important in the history of aviation. At Dayton, Ohio, two bicycle makers, Orville and Wilbur Wright, after years of study discovered the secret of lateral control of the airplane. While fooling with a pasteboard box in which tires had been shipped, one of the brothers (legend credits Wilbur) warped the cardboard, one end in one direction and the other in the opposite direction. For months the Wrights had been studying the problem of lateral balance and the warped cardboard gave them an idea. Why not make sections of the wing's trailing edge flexible and arrange controls to coordinate the horizontal rudder or elevator with the controllable trailing edges of the wing?

Thus the aileron came into being. The method they worked out, with the improvements of nearly half a century of experience, is that used today.

The second event of particular interest also took

LINDBERGH: "Tech Rep"

By LAUREN D. LYMAN

place in the winter of 1902. On February 4, 1902, Charles A. Lindbergh was born at Detroit, Michigan. On December 17, 1903, when the baby was twenty-two months old and growing quite satisfactorily on the family farm at Little Falls, Minnesota, Orville Wright, prone on the lower wing of the first powered Wright biplane, released the wire that held the throbbing machine to the ground, took off and flew 120 feet in 12 seconds at Kitty Hawk, North Carolina.

The Lindbergh story in aviation is a familiar one. Very little, however, has been printed concerning the later events of his career in aviation, nor has much been said of his work with the various divisions of United Aircraft Corporation. As a consultant for Pan American Airways, when the first transoceanic clippers were being built by the Sikorsky division, Lindbergh was a frequent visitor at the plant in Stratford, Connecticut, and at Pratt & Whitney Air-

Mr. Lyman, vice-president of United Aircraft Corporation, and formerly aviation editor of the New York Times, has been a business associate and close friend of Colonel Lindbergh for more than twenty years. This article appears through the cooperation of United Aircraft Corporation and its publication, "The Bee-Hive."

AIR TRAILS PICTORIAL

craft in East Hartford. He helped with the engineering tests of those Sikorsky flying boats which were to pioneer transoceanic flights over the Atlantic and Pacific for Pan American.

It was early in the war that United Aircraft began to see more of him. After a busy period in Detroit when he was the late Henry Ford's right-hand man in the first tests of the B-24s, he joined United Aircraft in an engineering consulting capacity. Lindbergh had never lost his interest in fighter planes. In Europe in the late thirties he had flown the best of the British and German ships, and his early reports to the late General Arnold warned of the shortcomings of our fighters and helped bring about much-needed changes in our own air services. Thus it was that Lindbergh was to be busiest at the Chance Vought division with the Corsairs.

Visitors in the pilots' room at Stratford in those hectic days grew accustomed to seeing his name with

Arctic to the tropics, the technical representatives of all United Aircraft's divisions were active. When Lindbergh as a "tech rep" for Vought wanted to go to the Pacific, the Navy was more than willing and agreed with him that his status should be exactly like that of any other technical representative.

His mission was to "study the performance of fighter planes under combat conditions" with a view to improvement in design and the design of new types . . . and he did just that. To his logical mind there was only one way to study a fighter plane "under combat conditions," and that was to fly on combat missions.

Some of the combat service people were a little incredulous at first. Old men of forty or more didn't fly combat missions in fighter planes—not because they didn't like to do it—but because physically they were too slow in their reactions. They were no longer rugged enough to take it. The doubters soon changed

May 20, 1927: At 7:51 a.m. Lindy takes his heavily laden Ryan off at Roosevelt Field and heads for Paris (right). Little did the world realize sixteen years later he'd be working in the Pacific with the Marines in a World War.



those of other pilots on the ever-changing charts marking the flight tests of plane after plane. He was a constant member of engineering conferences. He began to visit the various naval air stations where pilots were learning how to land and fly and maneuver this fast, high-performance fighter. He took part in maneuvers and mock combats. The story is still repeated, when Marines get together for "hangar flying," of one occasion on the West Coast when Vought's 41-year-old "tech rep" went up with two of the Marine's crack performers, and in a high-altitude gunnery contest "out-guessed, out-flew and out-shot" them both!

"We wanted him to join the Marines and come right out to the Pacific with us," the famous Marine ace, Major Joe Foss, told this writer. Eventually he did get out to the Pacific. During the war, in every zone, on every carrier and military air field, from the

their minds. Lindbergh went on many missions in Corsairs, took part in strafing raids, flew cover for bombers and did some special bombing to show just what a Corsair could do.

On one occasion, a strike on Wotje Island, Lindbergh planned to take off with a 4,000-pound bomb-load in addition to his ammunition load for four .50-caliber machine guns.

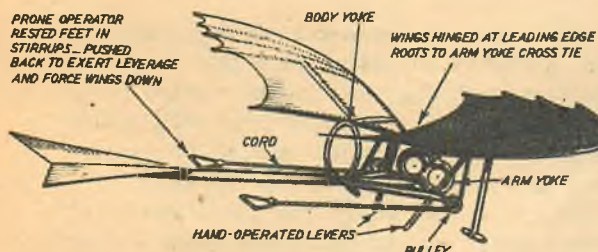
He found a fourteen-knot cross wind on the strip and ordered one of the 1,000 pounders removed. The weather was not perfect. The winds were gusty. A rain squall blew across the area, heavy and blinding. The moment it passed he took off.

"Made a curving take-off," he reported, "because of the cross wind heading toward a point half way along and on the windward side of the runway. No trouble getting off . . ."

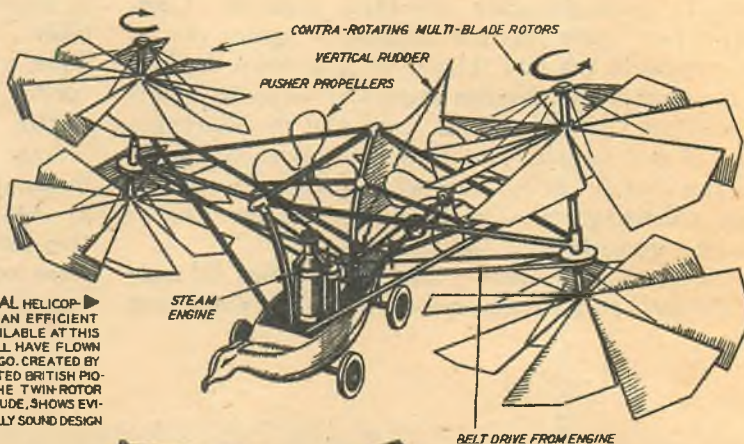
But apparently others (Continued on page 64)

Air Progress

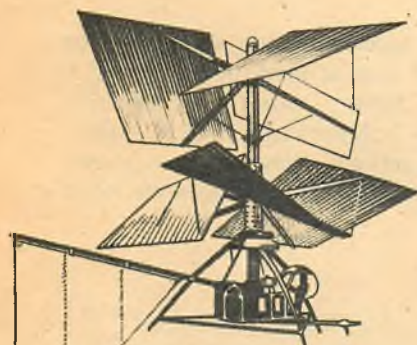
PRONE OPERATOR
RESTED FEET IN
STIRRUPS... PUSHED
BACK TO EXERT LEVERAGE
AND FORCE WINGS DOWN



▲ 1490 FIRST SCIENTIFIC APPROACH TO THE PROBLEMS INVOLVED IN HEAVIER-THAN-AIR FLIGHT WAS THIS MAN-POWERED ORNITHOPTER DEvised BY LEONARDO DA VINCI—A BRILLIANT 15TH CENTURY MASTER-CRAFTSMAN, ARTIST AND ENGINEER. IT FAILED TO FLY BUT WAS A NOTEWORTHY EFFORT

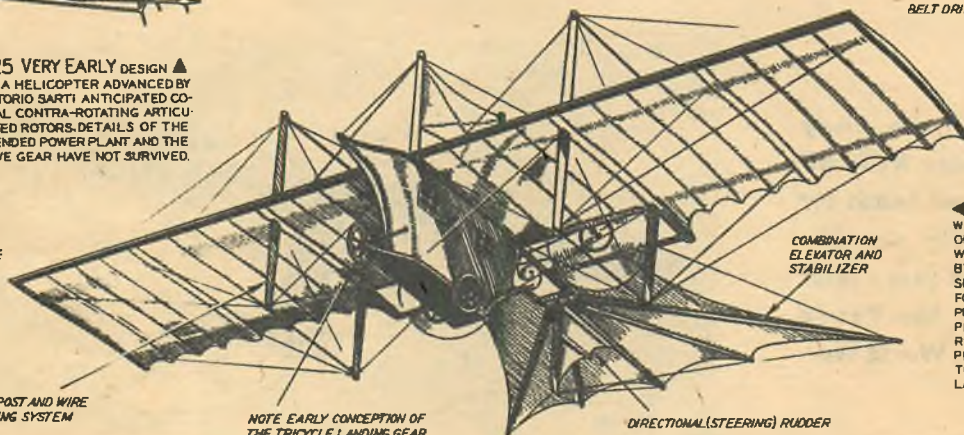


1842 FIRST PRACTICAL HELICOPTER DESIGN WHICH, HAD AN EFFICIENT POWER PLANT BEEN AVAILABLE AT THIS EARLY DATE, MIGHT WELL HAVE FLOWN MORE THAN 100 YEARS AGO. CREATED BY SIR GEORGE CAYLEY, NOTED BRITISH PIONEER, IT INTRODUCED THE TWIN-ROTOR SYSTEM AND, THOUGH CRUDE, SHOWS EVIDENCE OF BEING A BASICALLY SOUND DESIGN



1825 VERY EARLY DESIGN ▲ FOR A HELICOPTER ADVANCED BY VITTORIO SARTI ANTICIPATED CO-AXIAL CONTRA-ROTATING ARTICULATED ROTORS. DETAILS OF THE INTENDED POWER PLANT AND THE DRIVE GEAR HAVE NOT SURVIVED.

CURIOUS SAIL-LIKE
APPENDAGE WAS MOST
LIKELY INTENDED AS
DIRECTIONAL CONTROL
OR STABILIZING SURFACE



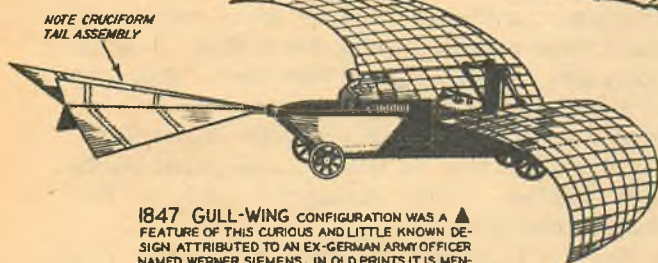
NOTE KING POST AND WIRE
WING-BRACING SYSTEM

NOTE EARLY CONCEPTION OF
THE TRICYCLE LANDING GEAR

DIRECTIONAL (STEERING) RUDDER

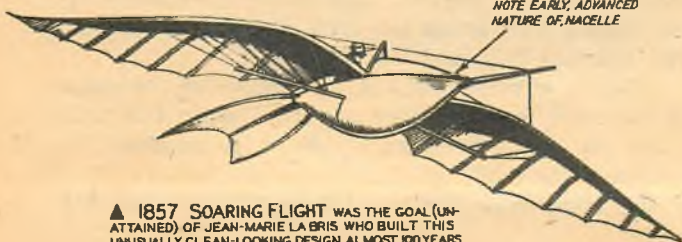
DOUGLAS
ROLFE

◀ 1842 HUGE AIRLINERS WERE ANTICIPATED IN THIS EXTRAORDINARY AND HISTORIC DESIGN WHICH WAS ACTUALLY PATENTED BY WILLIAM SAMUEL HENSON. THE SPECIFICATIONS CALLED FOR 150-FOOT WING SPAN, 20-FT. DIAMETER PROPELLERS AND A STEAM POWER PLANT. CONFIGURATION CRUDELY RESEMBLED THAT OF PRESENT AIRPLANES AND THE HENSON WING-TRUSS WAS OFTEN BORROWED BY LATER, MORE SUCCESSFUL DESIGNS



1847 GULL-WING CONFIGURATION WAS A FEATURE OF THIS CURIOUS AND LITTLE KNOWN DESIGN ATTRIBUTED TO AN EX-GERMAN ARMY OFFICER NAMED WERNER SIEMENS. IN OLD PRINTS IT IS MENTIONED AS A ROCKET-PROPELLED PLANE BUT WAS MORE PROBABLY A STEAM-POWERED ORNITHOPTER

NOTE EARLY, ADVANCED
NATURE OF NACELLE



▲ 1857 SOARING FLIGHT WAS THE GOAL (UN-ATTAINED) OF JEAN-MARIE LA BRIS WHO BUILT THIS UNUSUALLY CLEAN-LOOKING DESIGN ALMOST 100 YEARS AGO. LAUNCHED FROM A HORSE-DRAWN CART IT IS BELIEVED TO HAVE ACTUALLY LIFTED FROM THE CART

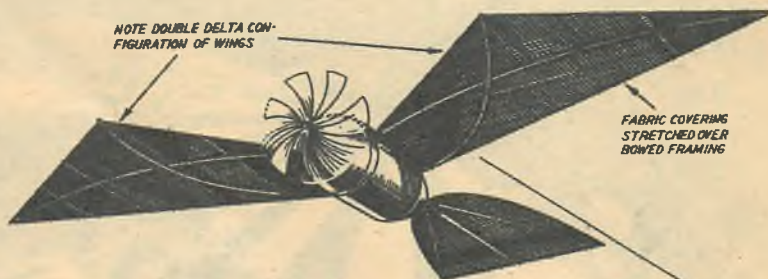
▲ 1848 FIRST SUCCESSFUL LARGE SCALE ENGINE-DRIVEN MODEL AIRPLANE. THE 20-FOOT STEAM-POWERED STRINGFELLOW MONOPLANE REPEATEDLY ROSE FROM ITS LAUNCHING CABLE IN WELL-BALANCED FLIGHT.

A chief fallacy attendant on aviation history is the widespread belief that the Wright Brothers "invented" the "aeroplane." While it is conceded today that the Wrights were indeed the first to demonstrate practical, heavier-than-air powered flight, it in no way detracts from their fame to point out that they developed a practical airplane rather than invented it. In many ways they were indebted to such men as Lillienthal, Pilcher, Herring, Chanute and other early pioneers who experimented with gliding and powered flight. Where the Wrights went beyond their predecessors and contemporaries was in their invention of a satisfactory means of longitudinal and lateral control, and in the development of a practical power plant. This issue traces some of the pre-Wright attempts to

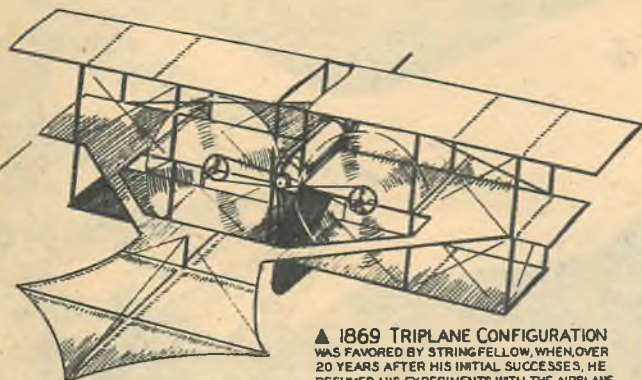
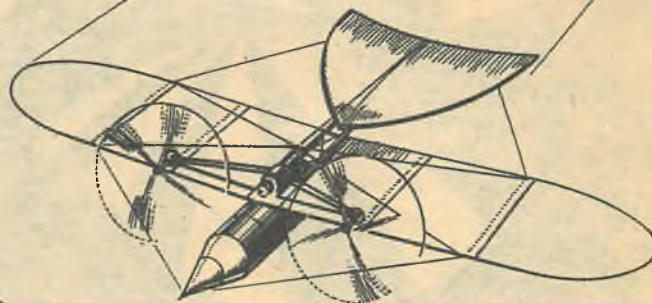
DEVELOPMENT OF THE AEROPLANE

Part 1 (1490-1890)

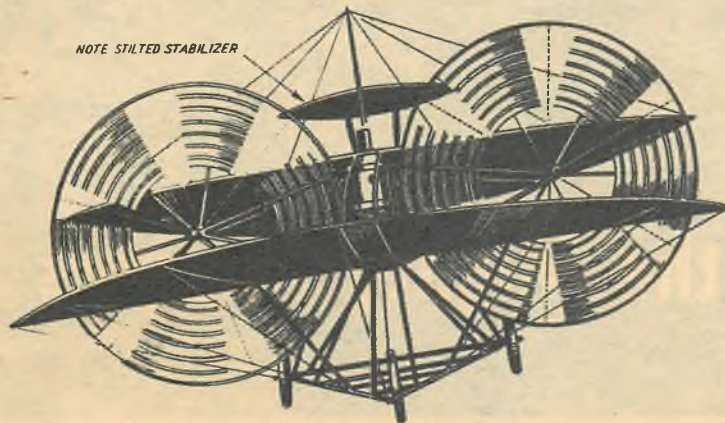
By DOUGLAS ROLFE



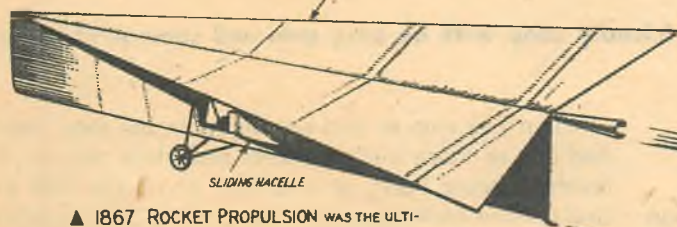
▲ 1857-1879 TWO STAGES IN THE APPROACH TO TRACTOR MONOPLANE DESIGN ARE PICTURED HERE. EARLIER MODEL BY DU TEMPLE WAS STEAM-POWERED—HAD SINGLE, MULTI-BLADE PROPELLERS. TATIN (BELOW) FAVORED TWO 4-BLADED PROPELLERS AND A COMPRESSED AIR POWER PLANT. TATIN ULTIMATELY SUCCEEDED (MUCH LATER) IN PRODUCING A GENUINE MAN-CARRYING PLANE ▼



▲ 1869 TRIPLANE CONFIGURATION WAS FAVORED BY STRINGFELLOW, WHEN, OVER 20 YEARS AFTER HIS INITIAL SUCCESSSES, HE RESUMED HIS EXPERIMENTS WITH THE AIRPLANE



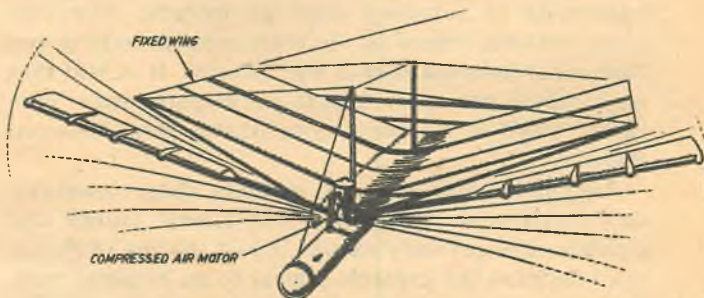
▲ 1867 ROCKET PROPULSION WAS THE ULTIMATE DREAM OF BUTLER & EDWARDS WHEN THEY CONCEIVED THIS SIMPLE DESIGN. A SOLID FUEL PROPELLANT-GUNPOWDER WAS INTENDED WITH ASCENT AND DESCENT CONTROLLED BY CHANGING THE CENTER OF GRAVITY BY MOVING THE NACELLE BACK AND FORTH



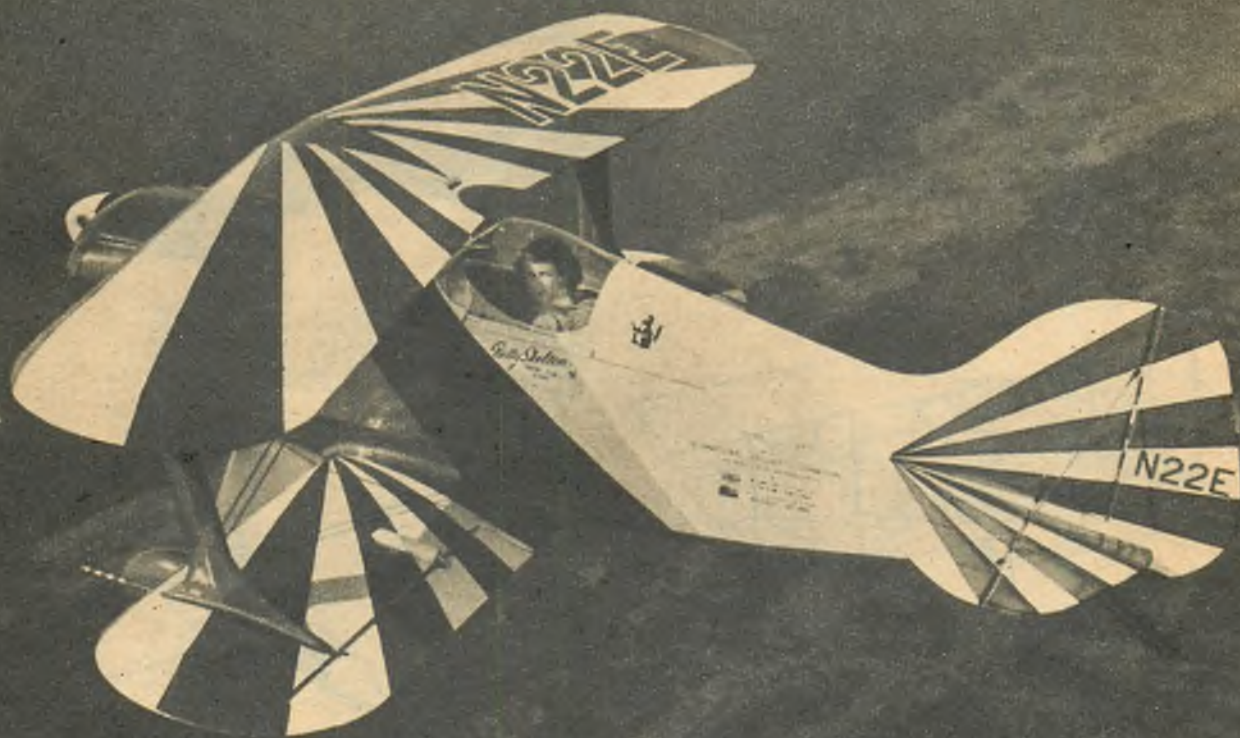
▲ 1871 "LITTLE HENRY" TYPE HELICOPTER WAS ACCURATELY FORECAST BY POMES & DE LA PAUZE IN THIS EARLY STAB AT ROTARY WING DESIGN. PROVISION WAS MADE FOR VARYING PITCH OF THE 2-BLADED ROTOR BUT THE MEANS WHERE BY THIS WAS CONTRIVED IS LOST IN OBSCURITY. A GUNPOWDER ENGINE PROVIDED MOTIVE POWER

produce a satisfactory airplane. All the designs shown here (and they represent only a few of the many advanced) seem slightly fantastic when viewed from the standpoint of present Air Progress, and many never got beyond the sketch book stage, but a careful study of these early efforts will reveal that practically every basic approach to powered flight, including reaction-propulsion, had either been envisaged or explored by these early apostles of aviation. Chief drawback of this period—ignorance of the laws governing flight and, even worse, complete lack of suitable power plants—prevented these very early pioneers from achieving their goal.

Next month we shall see how rapidly the "aeroplane" developed, and how close became the race to be first to fly.



1890 ▶ FLAPPING FLIGHT WAS PERFECTED BY LAWRENCE HARRIS GRAVE, AUSTRALIAN PIONEER OF THIS TYPE OF POWERED FLIGHT. HE LATER DIRECTED HIS TALENTS TOWARDS DEVELOPING BOX-KITE GLIDERS



Mr. Pitts —and the Mighty Midgets

Florida's favorite aircraft "manufacturer" is a friendly chap with an easy grin and some pert planes.

By ED FRANCIS

IF you are an *airplane* man you should drop in and see Curtis Pitts at the Gainesville, Florida, airport the first time you're near there. Know what an *airplane* man is? Well, he's of the breed who can appreciate an airplane from an esthetic viewpoint alone without regard to the crass money-making and functional potentialities it may possess. It is said that an airplane can even talk to an *airplane* man; certainly there is a strong sympathetic bond between them.

And of all airplanes the midgets, those beautiful, tiny single-seaters, friendly and frisky, jaunty and quick, whose primary excuse is just the joy of flying, have perhaps the greatest appeal to an *airplane* man. These are planes you strap on, their nerves are attuned to yours, you "think" them around the sky.

When you stop in and see Curtis in his shop, you'll find one or more midget racers and stunt planes just finished, being built, or modified, or maybe just sitting around looking pretty. Also, you'll find his piloting friend Phil Quigley and a few other *airplane* men, so you will have a fine time.

Curtis Pitts is a slim, friendly fellow who pretends that his chief trait is laziness. You'll doubt this after knowing him. He runs a mechanics school, an aircraft repair station, and has designed and built some of the most successful midgets in the sky today. We cite Betty Skelton's "Little Stinker" as one, and the new Pitts Special racer as another. In its shakedown competition at the 1950 All American Air Maneuvers at Miami the racer placed fourth in the Continental Trophy race soon after its flight test. Right off the drawing board, so to speak, it beat the Goodyear trophy-winning "Buster."

Betty Skelton, the women's international aerobatic

champion, says Curtis Pitts builds the best airplanes in the world. And if you've ever seen Betty and the "Stinker" and their precision aerobatics, you can understand her admiration for the Pitts brand of flying machine.

Pitts built his first airplane in Georgia when he was fifteen years old. It was a combination of Heath, Pientenpol, and other ships of the same vintage popular with the home builders. "It was kind of a hybrid airplane," Pitts recalls, "stuff I could handle in my little shop. Mostly wood."

"How did it fly?" we asked him.

"Never exactly flew. Just short hops a few feet off the ground, then I'd close the throttle and let it down. I hadn't learned to fly yet anyway," Pitts added as an afterthought. "And one day I got it a little too high and a gust caught one wing. It went down and things started happening so fast I never did catch up with them."

That was number one, but on his second home-built job Curtis did teach himself to fly and he's been up to his neck in aviation ever since.

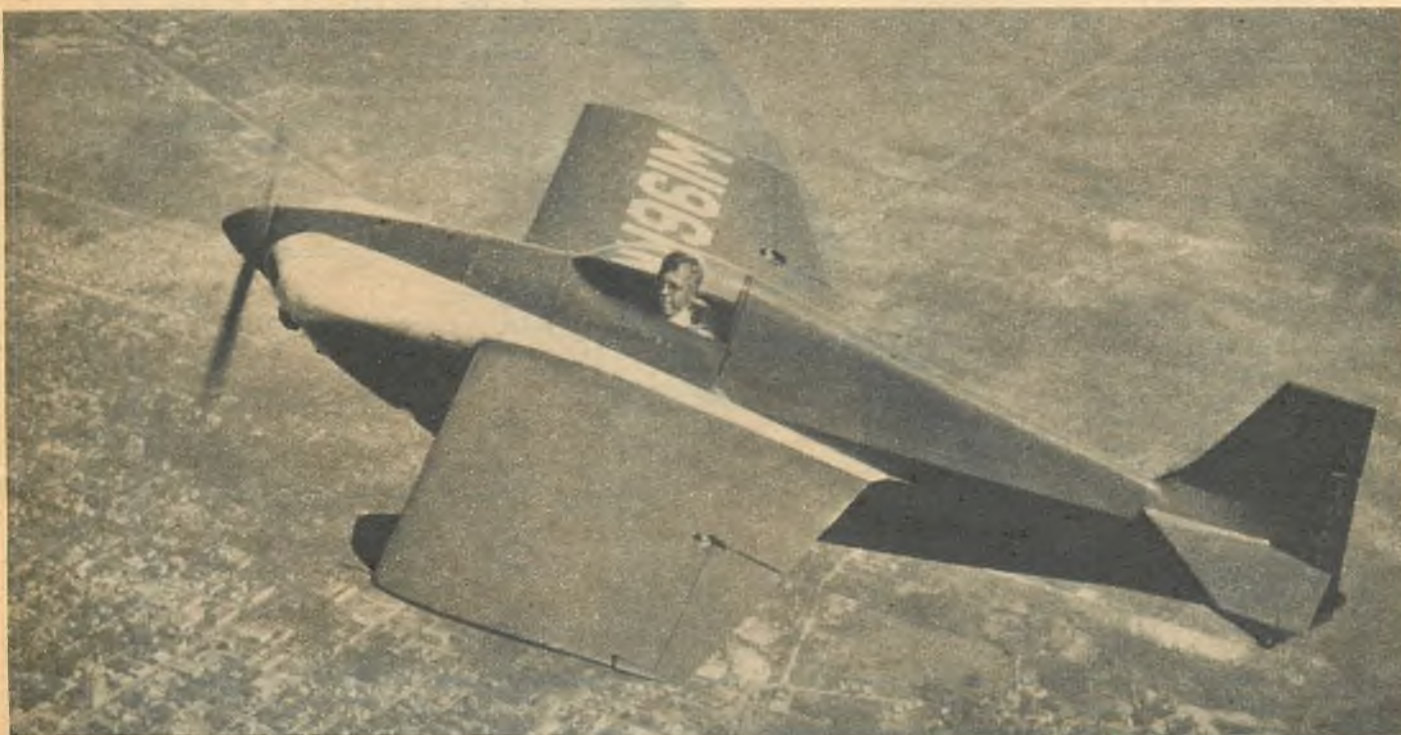
The first of what we might call the modern Pitts Specials was built at Jacksonville, Florida, in 1945, and was one of the biplane models—the forerunner of the Little Stinker, in fact. These biplanes are colloquially known as the "Jeeps."

The second Special was built at Gainesville in 1947 and was flown in air shows by Phil Quigley and then bought by Jess Bristow of Miami. This is the ship Betty Skelton has now. It (Continued on page 78)



● Curtis Pitts, left, and Phil Quigley at work on the fuselage of the latest Jeep which will have a 125 hp Lycoming.

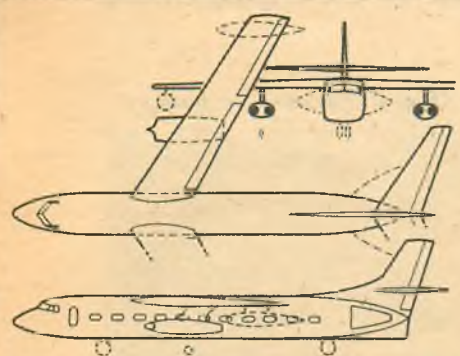
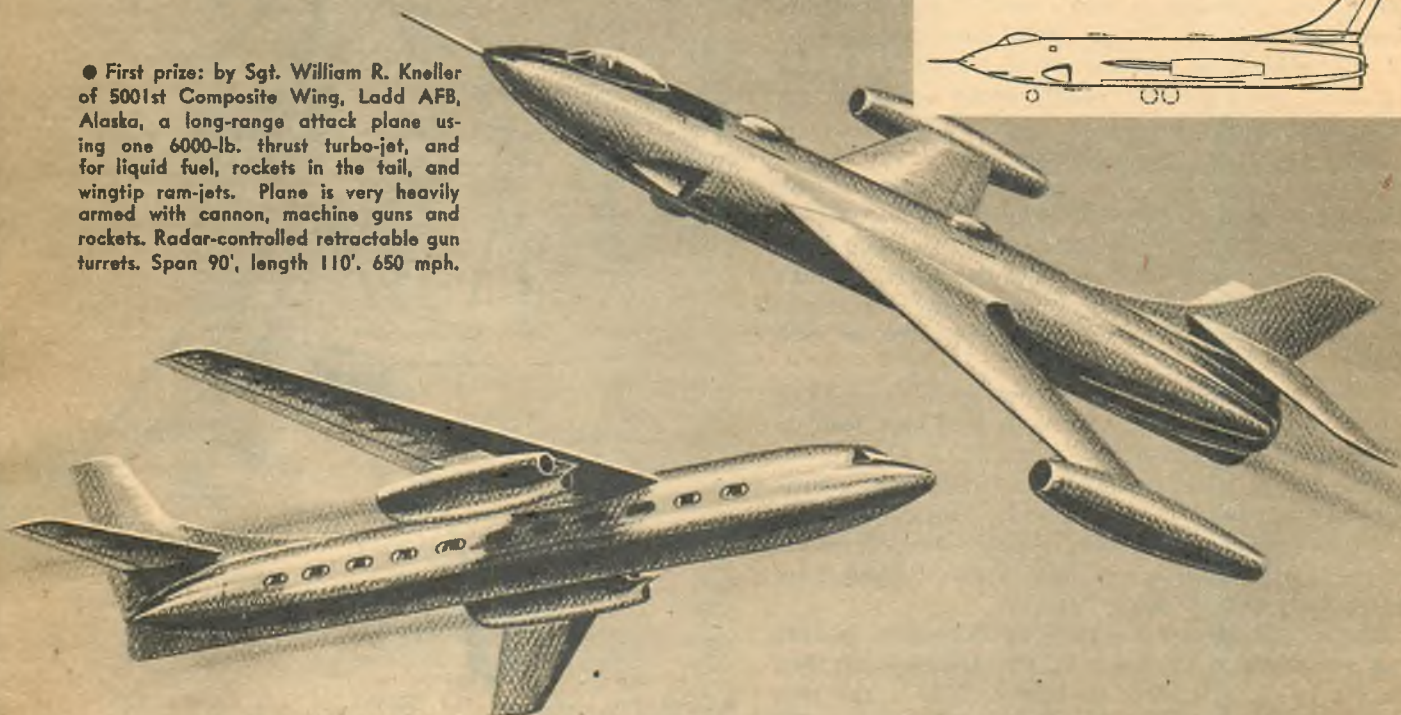
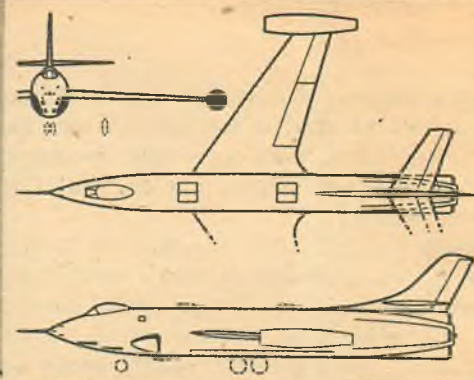
● The new Pitts racer which made its appearance at the 1950 Miami Air Races flown by Phil Quigley. Ship nosed out Brennand.



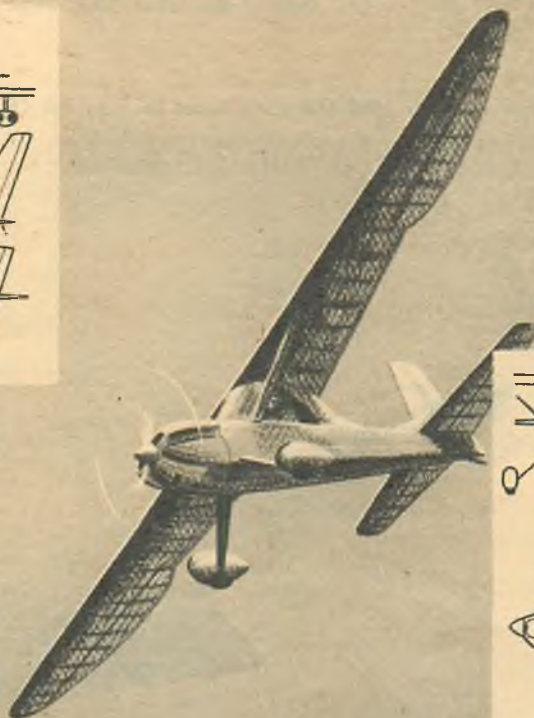
Airmen of Vision

DESIGN COMPETITION

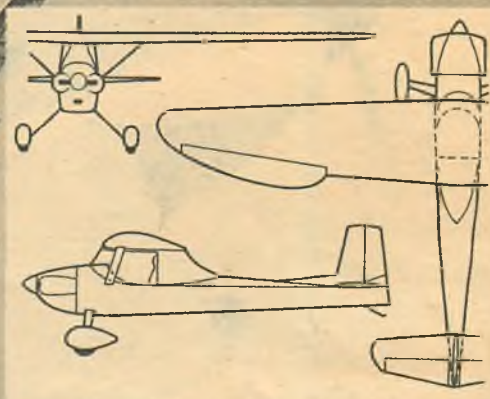
● First prize: by Sgt. William R. Kneller of 5001st Composite Wing, Ladd AFB, Alaska, a long-range attack plane using one 6000-lb. thrust turbo-jet, and for liquid fuel, rockets in the tail, and wingtip ram-jets. Plane is very heavily armed with cannon, machine guns and rockets. Radar-controlled retractable gun turrets. Span 90', length 110'. 650 mph.



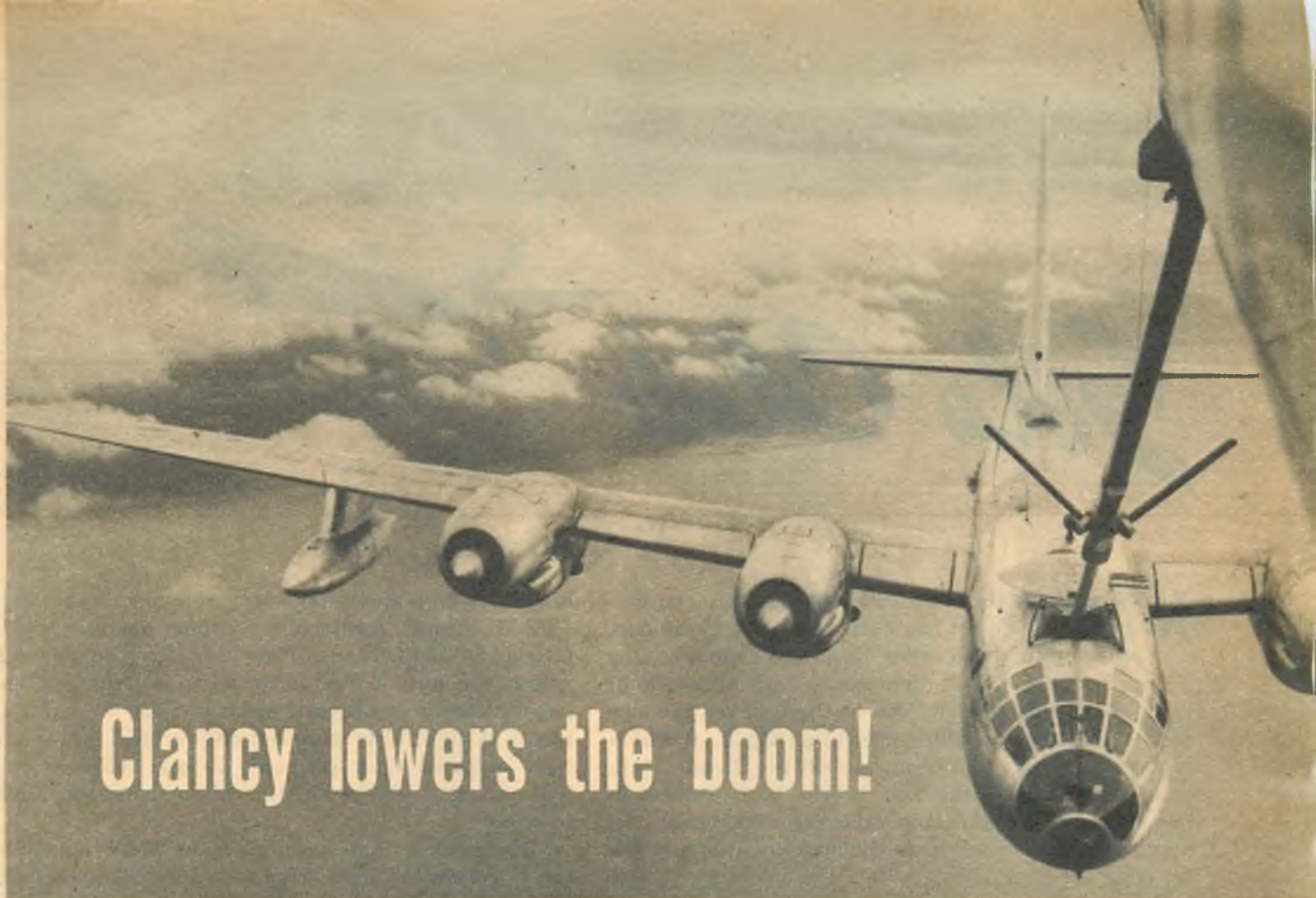
● Second prize: by R. J. Schmitt of San Leandro, Calif., a 40-passenger jet transport powered by four turbo-jet engines developing 7000 lbs. of thrust each. Fuel is carried in wingtip tanks which in event of crash can be jettisoned to prevent fire. Fuselage air brake. Span is 85 feet.



● Third prize: by Michael H. Krim of New York City, a single-place lightplane for sport flying and building up solo time. Configuration closely follows that of a free flight gas model of the pylon brand. This type of plane should have excellent stability and low stalling speed. Large butterfly ailerons are the kind successfully used on sailplanes and give good lateral control. Engine develops around 30 hp. The wing span is 24 ft.

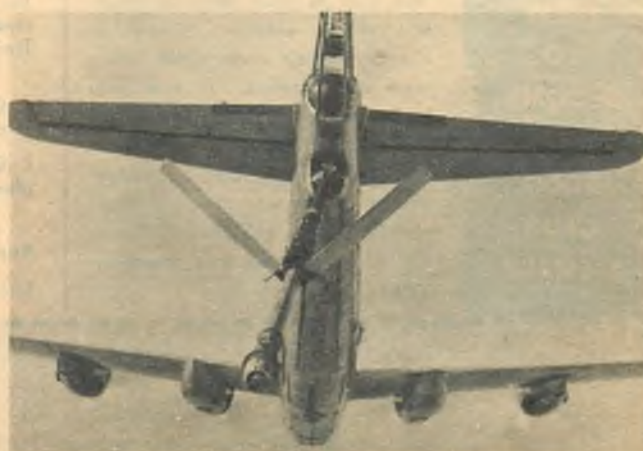


Air Trails has opened its columns to those who are interested in presenting plans for "aircraft of the future." Rules governing the competition are as follows: Three-view sketches of the proposed aircraft will be required. These should be not less than 8½ x 11 inches for the entire three-views. Give sketches of the complete airplane in three-quarter front and rear positions. Photos of a model of the proposed design may be included. Information on power plant(s), estimated performance, dimensions, and explanations of any unusual features are required. Data as to age, occupation or schooling of the entrant will be welcomed by the editors and judges. Designs may be of any type: commercial aircraft, military planes (fighters, bombers, troop transports), planes for the private flyer and single-engine sporting or racing craft. The entry each month judged the most practical or of the greatest significance will receive an award of \$25. Payments of \$5 will go to the runners-up. Entries will not be returned and for that reason those participating should retain copies of all material submitted. Mail entries to Airmen of Vision, c/o Air Trails, Box 489, Elizabeth, N. J. The editors regret because of large number of entries they cannot enter into correspondence on A of V.



Clancy lowers the boom!

LATEST wrinkle in air-to-air refueling is a hollow boom lowered from the tanker plane and actually "flown" into a coupling located on the nose of the receiver plane. The boom is equipped with ruddervators connected to airplane-type controls in the tail gunner's compartment of the tanker. There a crew member (naturally nicknamed "Clancy") guides it into the "mouth" of the plane below. The flying boom is equipped with de-icers which permit refueling under adverse weather conditions. By use of the flying boom, transfer is faster, accomplished at higher altitudes.



Solo Club



NOW that the barbaric and senseless spin requirement for a ticket has been relegated to the past, along with those other nostalgic memories, the Jenny and the OX-5, lightplanes and hence flying itself will become safer. Due to the spin requirement planes had to be capable performing the stunt which, a generation ago, had been dubbed the dreaded tail-spin. This despite the fact it had been generously proved that spin and spin recovery experience bore virtually no relationship to the accident rate and was no cure for that sneak killer, the inadvertent stall and/or spin.

The intentional spin differed as day from night from the accidental stall. The accidental stall struck swiftly and overwhelmingly so that lucky survivors literally could not say what struck them, even when all the details of the mishap remained clear in their minds. To this day the average pilot will resist to the death the idea that you can perform an aileron spin by slowing up a plane, holding crossed controls as is sometimes done in supposedly normal operations, then dropping the low aileron to bring up a wing when a gust further banks the ship. A good pilot can cause a ship to spin out the bottom two out of five times by duplicating this bonehead

maneuver on a gusty day. Maybe a "poor" pilot, too.

A. H. Knouff, formerly an airport operator and a Ground School Officer of Navy Air Ferry Squadron 1, gets to the core of the matter when he tells us, "The usual methods of teaching spins to meet the requirements of flight tests were not only useless, but might have defeated their purpose. I hope the new rule will encourage the production of airplanes less liable to spin.

"Recognizing that 'normal' spins were not sufficient, 'accidental' spins were added to the curriculum. Still stall-spin accidents headed the list. The trouble was that training spins were 'accidental' in name only. They were just as stylized as normal spins.

"While acting as a 'student' on an instructor course in 1941," continues Knouff, "I discovered that I could execute as much as a full turn of a spin without the 'instructor' knowing what had happened. I suspected that an airplane which appeared difficult to spin, might do so easily under certain conditions. I thought that gusty air might produce these conditions. This is true, but then, one day, a white-faced pilot of considerable experience declared that a Taylorcraft had just spun for no reason at all as he was making his final approach. I offered to (Continued on page 80)

HOW TO BECOME A SOLO CLUB MEMBER

This club is open only to those who have actually soloed a heavier-than-air craft, either powered or motorless. It does not matter where or when the flight was made. Applicants must furnish the membership committee with a satisfactory proof of their qualification for acceptance. There are no dues. Once a member, always a member.

To obtain sterling silver Solo Club wings and life membership card, send coupon, with 75¢, to Solo Club Membership Committee, Air Trails Pictorial, Box 489, Elizabeth, N. J.

Proof of qualifications as a Solo Club Member:

1. CAA Airman Certificate, number and rating.....
2. F.A.I. license and number.....
3. Evidence of: Service in Army, Navy air forces, either as a rated pilot or having received flight training including solo time (attach).

Applicant Age.....

Street..... City or Town..... State.....



The Civil Air Patrol is the civilian auxiliary of the United States Air Force. It deserves the support of every citizen. Membership is open to any American boy or girl 15 years of age or older of good moral character. Those under 18 are classed as CAP Cadets, those over 18 are Senior Members. If you would like to join the CAP write a letter to

Air Trails (Box 489, Elizabeth, N. J.) indicating your interest, and your communication will be forwarded to your state's Patrol Wing Headquarters. Wing HQ then transmits it to the Group, Squadron or Flight nearest your home. For latest news of the CAP read this monthly Newsletter which is prepared in Washington, D. C., and New York City.

Civil Air Patrol

Newsletter

Officer Training for Those 18-20: National Headquarters announces the formation of a junior division within CAP to be known as the Officer's Training Corps, open to all CAP personnel not less than 18 nor more than 20 years of age. The objective of the OTC program will be to provide a practical means for developing well disciplined, reliable, potential leaders with a high degree of resourcefulness and initiative, and with the highest standards of honor and integrity.

All administrative functions of the OTC will be effected through the Wing Commanders, who will be governed by policies and instructions issued by Nat. Hdqts.

The OTC personnel will be organized into units as a part of the unit with which it functions. Sections organized within the OTC will cover Cadet Administration, Understudies to CAP staff and squadron officers, and special training. The OTC will be commanded by individuals selected from OTC ranks.

Recommendations for ratings and promotions will be prepared by the Unit Training Officer, and upon approval by the CAP Unit CO, be forwarded to Wing Hdqts. for concurrence and issuance of orders. Members of the OTC will be selected to serve as Cadet Administrators, or as Understudies to staff and squadron officers of the Senior CAP organization, or for training in specialized projects. Uniforms will be the same as for senior members, except OTC personnel will wear the garrison (flight) cap, and shoulder sleeve insignia will be the same as authorized for seniors except it will have added a blue rocker with OTC in white letters. In addition silver cut-out letters OTC will be worn on the shirt collar in addition to the CAP cut-out letters.

Clarify Cadet Ages: Although the Civil Air Patrol Cadet Program is limited to boys and girls between 15 and 18, certain youths in their 14th and 18th years are eligible for membership, National Headquarters CAP pointed out.

Any young boy or girl whose 15th or 18th birthday falls within the school year (September through May) will be eligible to join the CAPC. For example, a Cadet whose 15th birthday occurs May 20 would be eligible to join CAPC the previous September while only 14 years old.

Similarly if the birthday of 18 fell after the school year started, even by only a few days, the youth could join and complete that school year as a

Cadet and attend summer encampment provided he or she had not already attended two encampments.

Cadets "Tour of Duty" for 3,000: The 1950 CAP Summer Encampment will involve an estimated 3,000 or more boys and girls between 15 and 18 years of age who will be selected for two-week encampments at 20 or more U. S. Air Force bases during July and August.

The selection of the Cadets is a matter that in most Wings has been left up to the Cadets themselves. As each unit's Cadets select the boy or girl they think most worthy of the honor, the names are forwarded on to Wing Headquarters for further screening and thence to National CAP Headquarters in Washington, D. C.

Many of the Cadets will fly to their bases in C-47's or C-45's, belonging to their Wings, or loaned by the Air National Guard or Air Reserve—usually operated with gasoline donated by a local Kiwanis or Rotary Club, or some public-spirited business firm. Others go by train or motor vehicle provided by Senior members. Each group is accompanied by Senior CAPers, and by volunteer AR officers who are responsible for the Cadets' physical and moral well being while away.

Boys and girls attend the same classes, receive the same instruction. The instruction is fairly well standardized at all the AF bases, although some Cadets are lucky enough to go to a base specializing in jet repairs. All girl Cadets attend the bases where women's quarters are available, and in addition get a glimpse into base hospital operations and learn about the duties of AF nurses.

In the two-week schedules, stress is put on the practical side of aviation. In most encampments groups of 10 to 15 Cadets are taken aloft for one to two-hour orientation flights in connection with regular missions. Whenever practicable each Cadet takes a stint at the instrument panel to work out specified problems of navigation. Map interpretation and observation work are done aloft. On the ground, Cadets have a go at the repair shops, communications activities, radar, parachutes, flying safety and other aviation instruction designed to give them both theoretical and practical "know how" in aeronautics.

Every precaution is taken for the safety of CAP Cadets; no serious accident has occurred in the past six encampments.

National CAP Headquarters considers

the Summer Encampments so important now that it has ruled that no Cadet can receive his certificate of completion of CAP's general three-year pre-flight training course until he, or she, attends at least two Summer Encampments.

National Chaplain Appointed: A nationwide organization of volunteer air chaplains throughout CAP was announced by National Headquarters with the appointment of Lt. Col. Robert P. Taylor, a survivor of the Bataan Death March, as National CAP Chaplain.

Col. Taylor plans to visit each of the 52 CAP Wings and to arrange for a selection of a chaplain at each Wing, usually a local pastor with wartime experience.

The new CAP Chaplains will have similar duties to those performed by the chaplains of the regular Armed Services. Their province will be the spiritual and moral welfare of Senior and Cadet CAPers, both at home, and in the case of Cadets, while they are at Summer Encampments or on exchange tours.

M/Sgt. William Forman, staff assistant in the Public Information Division at CAP Nat. Hdqts., will become the new assistant to Col. Taylor.

Headquarters Reporting: Duty as instructors with CAP is one means by which USAF reservists and Air National Guardsmen may perform inactive duty training and accumulate points toward promotion and retirement.

Three State Wing Commanders have resigned, Colonels Kilbourne L. House, W. O. Fuller and Joseph S. Bergin of New Mexico, Iowa and Utah respectively; were replaced by Lt. Col. Howard Livingston, Maj. H. E. McKinney and Maj. Ralph E. Winn as Acting Wing Commanders.

Lt. Col. Frank P. Smith is the new supply chief. Col. Smith replaces Lt. Col. John B. Pattison, Jr., who has been assigned to Afghanistan as air aide to the U. S. Military Mission in that country. Col. Smith is a veteran of the Berlin airlift.

Approximately 200 high schools in nearly 40 states are now proceeding with aviation classes in which the new CAP Aviation Study Manual is being used, with the work being done in cooperation with local CAP units in most cases.

CAP Briefs: The Idaho Wing is buzzing with activity: 8 more PT-13's and an L-4; two new Squadrons at Arco and Richfield. (Continued on page 81)

Cross Country with C.A.P.

New York's Group Six at Buffalo put on a 47-minute search and rescue mission that would have brought huzzahs from the AF. Group CO Maj. Robert E. Davidson alerted the Group at Buffalo airport. Fifteen planes, 50 CAPers, mobile radio cars and first-aid crew in an ambulance discovered the simulated "wrecked plane" and rescued the plane's "occupants" within 47 minutes.

Mississippi has acquired three additional aircraft, bringing its total to five available for search and rescue and Cadet orientation . . . Greenwood's Flight may be a Squadron by the time you read this; with an active program, a new headquarters of six rooms, a Link Trainer and the possibility of an L-5, the unit expects to expand rapidly.

South Dakota organized its first accredited CAP high school class at Estelline with Ronald Oines as Cadet Commander, and 30 Cadets as members.

Maine's Brunswick Squadron has a new CO, Robert Downs, ex-marine fighter pilot now attending Bowdoin College . . . Portland Squadron lost a swell CO, Lt. John H. Middlebrook.

National Capital has a new USAF-CAP Liaison Officer, Capt. Hiram I. Anderson, Jr., from Little Rock, Ark. Washington's gain was Arkansas' loss and vice versa, since the former Washington Liaison Officer, Maj. Leo Alverson exchanged places with Capt. Anderson. The latter had extensive experience in the last war, received the Air Medal and served in the Aleutians with 11th AF.

New Mexico's Roswell, Artesia, Portales and Hobbs Squadrons found a crashed lightplane only three and a half hours after Air Rescue Service notification . . . The Hobbs Squadron was given a special commendation recently by Wing CO, Col. Kilbourne L. House, for its ability, initiative and performance of duty.

Alaska established another "first" recently for Alaskan aviation when the first class of Cadets, all Anchorage High School students, were sworn into the Alaskan CAP by Col. R. G. Ruegg, Dep. Chief of Staff, Alaskan Air Command.

Minnesota has received a free offer of regulation CAP Cadet shoulder patch to every new member who joins CAP in Minnesota, from Federal Supply Co., 135 Henry St., New York 2, N. Y. The patch is given direct to the Cadet, although the Wing Hdqts. calls attention to the fact that pilot and observer wings and all CAP ribbons must be ordered through Wing Hdqts. . . . Wing CO, Col. Vee L. Phillips has been appointed a member of the finance committee of the Nat'l. CAP Board . . . Mora Squadron's new short wave radio transmitter was built by the unit's Cadets; on first try, it got Omaha.



● The Alaska Wing of the Civil Air Patrol is organizing with considerable speed. Emphasis is on Cadet development. Here are the first boy and girl Cadet enrolled: 1st Lt. David Wilferd Brown and Cadet Doris June Saario of the Anchorage Squadron. Wing's training officer, Major Frances M. B. Marrihew, is engaged in teaching Arctic survival course.



● Texas is proud of its CAP Cadets and Col. D. Harold Byrd proved it by establishing a scholarship at the University of Texas for each year's outstanding Cadet. Cadet Capt. Howard Hill, Dallas, receives first scholarship check from Mrs. Byrd as National CAP Commander Maj. Gen. Lucas V. Beau, present for occasion, looks on with satisfaction.

★ ★ ★ ★ ★

JOIN THE CAP

If you're 15 or older
you should check into
the CAP. Fill out and
mail this coupon to Air
Trails, we'll forward it
to your state wing
that in turn passes it
on to your nearest unit.

★ ★ ★ ★ ★

C. A. P. NEWS c/o Air Trails

Box 489, Elizabeth, N. J.

I'm interested in more information on the CAP
and would like to hear from my nearest unit.

Name

Address

City (and Zone).....

State Your Age

Air Trails, June '50

Goodyear-Continental Midget Race Planes

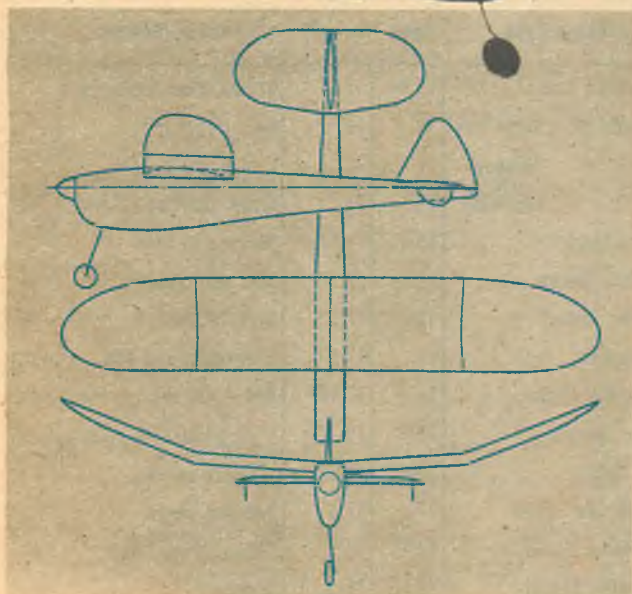
Racing No.	Regis. No.	Plane Type	Span	Length	Color Scheme
1	N1292	Wittman Bonzo	15'4"	17'6"	Yellow, blue landing gear
3	N20C	Cosmic Wind, Little Toni	19'	16'	Red, cream trim
4	N21C	" " Minnow	19'	16'	Bronze, cream trim
5	N22C	" " Ballerina	19'	16'	Green, chartreuse trim
8	N1961M	Pitts Special	15'6"	15'5"	Red, cream trim
10	N1E	Falcon Special	17'2"	17'6"	Blue and cream
14	N5623N	Miller Special	18'7"	17'1"	Grey, red trim
16	N26C	Shoestring	19'	17'5"	Chartreuse, red trim
20	N14855	Wittman Buster	16'	17'10"	Red
22	N7E	Ibbs Special	19'	19'	Light green, dark green trim
29	N138C	LIT Special	20'	20'	White, blue trim
31	N31C	Kistler La Jollita	17'	17'6"	Red and white
34	N44183	Williams Estrellita	19'9"	16'5"	Yellow, black trim
35	N70E	Coonley Special	18'6"	18'	Orange
39	N24C	Sorensen Special	18'6"	15'6"	Black, white trim
40	N1210M	Thompson Special	17'10"	16'	Yellow and red
42	N3154K	Leighnor Mirage	18'7"	17'5"	Deep maroon
47	N66317	Pack Assoc. Li'l Rebel	17'2"	16'	Yellow, green spinner
50	N60298	Schroeder Dragontail	20'	19'	Aluminum, red trim
51	N2E	Carolina Aviation	16'6"	16'4"	Red
59	N5713N	Christensen Zipper	16'	16'	Yellow, blue trim
63	N5541N	Anderson Special	17'	17'	Red, yellow trim
67	N5111H	Long Midget	18'5"	16'	Aluminum, maroon trim
77	N42N	Beville, Li'l Spook	16'	17'	Grey, black trim
84	N1305V	Thompson-Balboni	19'6"	21'6"	Maroon
92	N6099	Falck, Rivets	18'	17'	Red and yellow
94	N68732	Foss Special, Ginny	20'8"	15'	Aluminum, maroon trim
97	N9059H	Denight Special, DDT	18'10"	17'11"	Yellow

This includes all ships participating in both (1949) Cleveland and (1950) Miami Air Races.

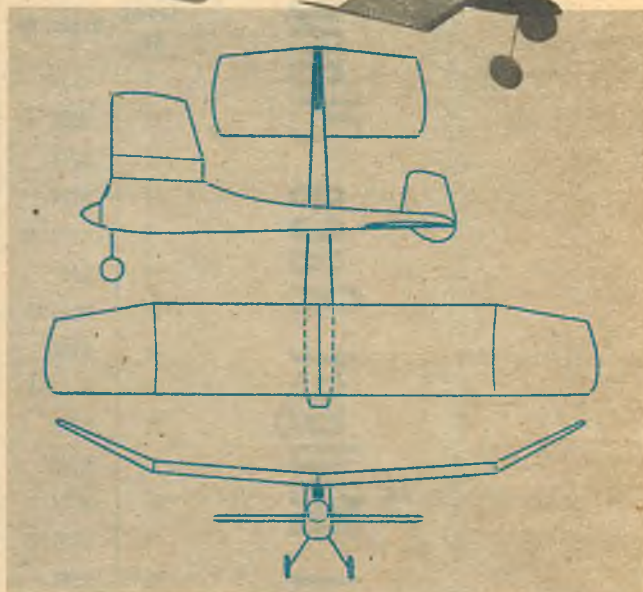
REGISTRATION, SIZE AND COLOR DATA



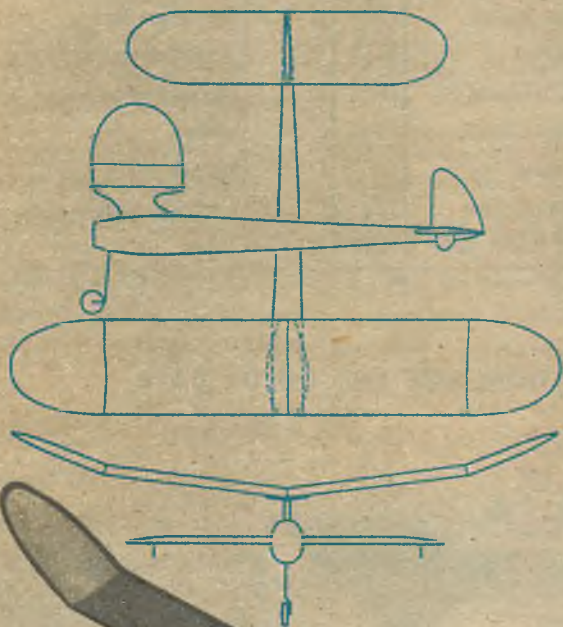
THE SHOULDER WING



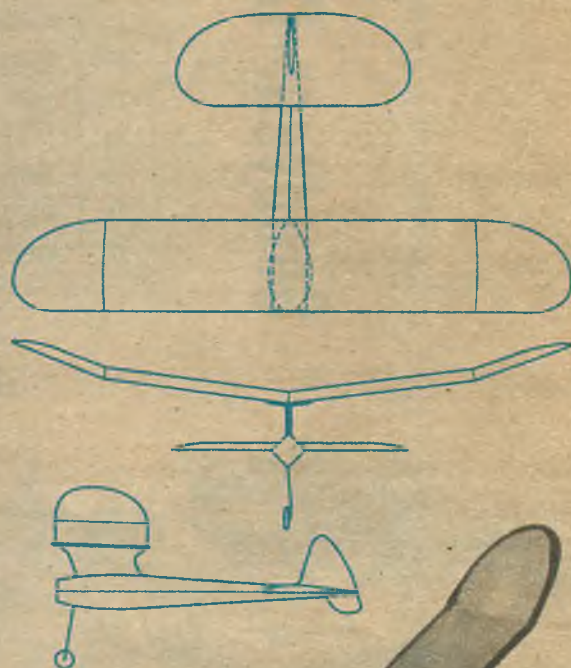
THE HATCHET



All American Free



THE CALIFORNIAN



THE EASTERNER



AIR TRAILS PICTORIAL

Editor's Note: One of the greatest comebacks ever staged in model aviation has been the return of free flight. Actually, it never went very far away, but the tremendous growth of control line activity directly after the war resulted in the free fliers being forced to take a back seat at contests. Now a better balance seems to have been struck with the result that all phases of aeromodeling have advanced tremendously during the past two years. The hobby-sport offers diversification as one of its main attractions—when one section overbalances the entire field as U-control did in 1945 and 1946, activity suffers. Here, then, is a round-up of national trends in free flight jelled into one model: the All American.

FREE FLIGHT, about the last frontier for the rugged individualist modeler, is the one competition category where overall dimensions, loadings, and shapes can be varied to suit a fellow's ideas. Speed jobs have come down to finless, helmet-cowled, clipped-wing bullets, as similar as peas in a pod. Stunters have grown bigger, lighter, and stumpier. Indoor jobs, at least the ones that win, look generally

"middle-of-the-road" airplanes should consistently outpace the others. A lot depends on where you expect to compete. And there are other factors.

An analysis of all free flight winners of both the Nationals and the Plymouth meets, and of standout designs over the past year, tells a highly interesting story. Not only are certain types at an advantage in certain sections of the country, but concrete facts on loadings, aspect ratios, and other pertinent features add up to very definite combinations when these facts are substituted for hearsay.

Most disputed point in free flight is wing loading. In other words, you'd expect the greatest variations in wingspans and areas. Yet, an average of dozens of

Flight Job

By WILLIAM WINTER



the same as they did in the days before U-control. To win, you must conform—except in free flight!

Yet you can't go at free flight willy-nilly, for certain schools of thoughts have proved effective trophy winners. Charlie Folk's Climax, for an example, is an extremely short-coupled, big-tailed, high pylon. Paul Gilliam's designs are long and thin. Dennie Davis' "middle-of-the-road" models come between the two. And there are others. Now the remarkable thing about many of these standout airplanes is that a designer may state that his approach is the best, if not the only, way to win contests consistently. Each is right, given his typical sectional weather. In Eastern winds, try to beat a Climax bouncing and turning on a dime. On a genuine sunny California day try to better a Civvy Boy. For average weather those

airplanes reveals that a solid eight ounces wing loading per square foot is winning the most trophies. Nor is this average the result of extremes, such as four ounces and twelve ounces; a cluster of big-name ships comes in at from seven to nine ounces and most of these hover around eight.

We should keep in mind, however, that this average is a "middle-of-the-road" figure. Careful analysis of "world beating" ships, in their own back yards as well as at the intersectional fracas, shows these loadings in the old Class C: 4.64, 9.3, 10.21, 8.87, 8.52, 5.75, 8, 8.61, 9, 8.64. Class A tended to be lighter,



● Construction of the All-American is a cinch. Plans are self-explanatory, no special instructions needed. Takes big A engines.



All American Free Flight

such as 7.8, 6.1, 4.83, 10.4, 7.8. Evidently, the wise boys still figure that to win you have got to get them up and the higher the better.

Such statistics could fill a book. But what do they add up to? To find that answer, five designs were worked up, four of them shown in three-view and "model-of-a-model" form, and the fifth was completely worked out, built, and test flown. This ship most nearly illustrates the average contest winner regardless of section. It is most interesting to note that this machine very closely approximates the outline and weights of Davis' San DeHogan, both being powered by a .199.

Plane #1: let's call this the Easterner. It is a near composite of Folk's Climax and Carl Wheeley's Senator and would be a sterling windy-weather machine. Its stabilizer area is about 50% of the wing, and its tail moment arm on the average is but 40% of the span. The pylon is quite high and the leading edge of the wing forward of the engine. The single-wheel gear shown might be made retractable, or can be replaced by a two-wheel gear if preferred. While no particular type of fuselage is standard, it does seem that the diamond cross section is used most often.

In order to make all these "models of models" directly comparable, aspect ratios of six to one are used in every case. The builder can vary these to suit his own ideas, but it would be well to keep in mind that the great majority of winners have aspect ratios of six or seven to one.

Plane #2: the Californian (with apologies to dissenters!). This is the long moment-arm flat-gliding, moderate pylon job representative of the Gilliam school of thought. A 50% stab is set on a 50-60% moment-arm fuselage. These ships actually follow the long fuse indoor gliders and under proper conditions have an ideal glide. Yet they are not too lightly loaded—or oversized—to handicap climb. One wheel is favored.

Plane #3: the Shoulder Wing. Generally frowned upon as inferior to the pylon as a means of handling power, the shoulder wing has, nevertheless, been proved by such builders as Don Foote and Jerry Brofman. It is a type of model thoroughly acceptable in the larger sizes, as indicated by Brofman's consistent winning at the Nationals. Foote has proved it acceptable in all sizes, his latest being a .19 job (now flying on a Forster 29) of fairly high aspect ratio, wing loading, but with fairly small moment-arm and tail area. Usually fitted with two wheels.

Plane #4: the Hatchet. You can't count this one out, for it is a type that has given birth to many of our best airplanes through the years. Examples—Banshee, Zombie, Pacer, Cumulus, and so on. Actually, it is a form of low pylon layout, with the pylon being stretched out as part of the fuselage. It offers the advantage of fully enclosed engine without excessive cross-sectional area. Both one and two wheels are popular.

Plane #5: let's call this (Continued on page 58)



Model Matters

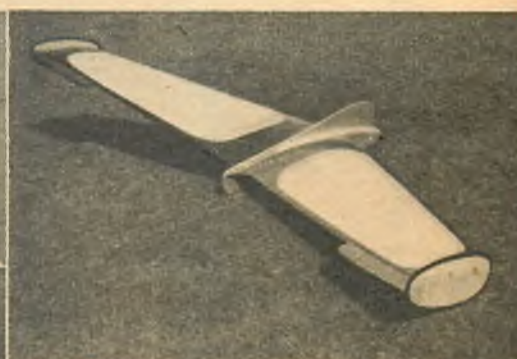
News, Views, Comments and Photos from Model Clubs and Enthusiasts in America and Overseas

• Payment of \$2 to \$5 is made on or before publication for photos of unusual interest sent exclusively to AT. Photos should be at least 4" x 5" on glossy paper. Retain negatives; no photos can be returned

• O. Z. Johnson, maintenance superintendent for Pan American-Grace Airways stationed in Limatambo, Peru, built this DC-3A. Two McCoy 29's, weighs 5½ lbs. Does 80 mph on 70 ft. lines (insert). O.Z.'s pres. of local club.



• Do our eyes deceive us? Nope, that's a Convair XF-92A; instead of jet power it has an O&R 29 and pusher prop. Don Caminsky, Los Angeles, made it. Span, 24 in.; length, 30 in.; sensitive and fast. U-control; quite an experiment.



• G. B. Dun, press secretary of Northampton Model Aero Club, England, shoots in this shot of 8½ ft. tailless towliner by A. J. Cockle. Wing area is 13½ sq. ft.; model weighs in at 5 lbs. Such beautiful workmanship.

DOPE CAN BY "DOPESTER"

LOTS of news and views this month, neighbor, so drop the glue stick for awhile, hitch your chair up a bit closer and lend an ear.

First of all, let's talk about the Navy. You may recall hearing that Navy personnel passed out some suggested rules at the last National meet for a "U.S. Navy Carrier Aircraft Control Line Model Airplane Event." Well, the idea was fine. All the modelers at Olathe, Kans., thought the Navy should get into the picture inasmuch as the Nationals were on a Naval Air Station. But the requirements were mighty stiff. So much so that after conferences with model builders and leaders, the Navy

rewrote the regulations. Cheers for them!

We like to see an outfit that will listen to reason, and if it gets off on the wrong course correct its thinking. Hats off to the seagoing airmen, then, for their new U-control carrier event.

Here are the official rules. We'll give them to you pretty much as the Navy released them, briefing where possible.

AMA rules apply except as modified. Design emphasis should be on simulation of a Navy carrier plane and its flight. Such characteristics as quick take-off, high speed, stability at slow speeds and a fuselage strong enough to take the shock of arrested landings are

desirable and very important factors.

Required are scale models of existing naval aircraft which may be to any scale. Deviation from scale is allowed in order to incorporate drag and lift devices and to allow proper cooling for the engine.

Models cannot exceed a size that would be greater than a 1/12 scale carrier elevator. This means maximum permissible span is 44 inches, length no greater than 58 inches and height not more than 17 inches.

There are no restrictions on size of engine or wing loading. All entries must have fixed landing gear and must ROG from a simulated carrier deck. A

• Not one, not two, but three Albatross tripe is the record of James I. Nobles and son of Covington, Va. What more can you ask of a loyal AT reader-builder? Four, you say? Hahl

• George De La Mater, 1949 National Meet Open Class indoor cabin champ, gets his .009 ounce Baby ROG off at a Kirkwood (Mo.) Thermaleers indoor meet. Thermaleers, oldest active club in Greater St. Louis area, includes McDonnell Aircraft Corporation engineer members.

• Radio control really gets small. Aerotrol unit in Baby Spitfire powered 36 inch span job by James Wood, Los Angeles. Weighs 18 ounces, has 180 sq. in. wing area. Slip is very responsive and has flown well.





● Dick Augsberger, Middletown, Ohio, and his O&R 23 glow plug Ryan Navion. Dick flies this ship at 80 mph from his wheelchair on 50 ft. lines. His brother turns him around. There's the team that gets our commendation



● Nieuport 17 built from free flight plans and converted to U-control by Dick Bell, Ithaca, N. Y. Span is 41½ inches. He uses an Ohlsson 29 for power. Dick secured plans from an English pen-pal, R. E. Fisher of Dartington. Plans across the sea, you might say. Ohh!



● All hail! Here's the first photo received by AT of our AT-6. And it came quite a distance—all the way from Boise, Idaho's Dusty Norton; uses Blue Streak 65. Dusty, wot's your address?

successful take-off rates 100 points. If a ship does not remain airborne and touches the flight circle after it has left the "deck," you lose the 100 points. An assistant can hold your model on the deck while motor is revved up. Timing starts instant plane is released. If not hand-held, time starts when model begins take-off run.

All clear so far? Flying is divided into two sections: high speed and slow speed flight. During the high speed phase the first 6 laps from take-off will be timed with 1 point awarded for each

feet. Hook can engage gear after you've landed or while the model is still in flight (ouch!). A big 100 points will go to the modeler who brings his ship in to rest still engaged in arresting gear. Half that, 50 points, goes if model is not engaged (does it use Pond's?), but is still on the deck. In either case, model can be in any attitude on deck except over on its back—then no points.

Now here's where the unification program is felt: 100 points will be awarded each model capable of flight if it is a true scale replica of any mili-

any take-off effort. Judging will be by Navy personnel, so that assures a fair, square deal to all.

The carrier deck will be 5 feet long and curved to fit a 70-ft. U-control circle. (No jokes now about the Navy's new circular carriers.) Deck will be 6 inches off the ground—pardon, simulated sea. A separate inclined stern ramp will be used to prevent damage to a model making too short an approach and landing just behind the carrier's stern. The deck will be 5 feet wide.

That about (Continued on page 94)



● Another Northampton model, this time from Massachusetts' Look Park Aero Club. Norman Gayer says this exact scale Cierva autogiro was built on bet. Has used .30 and .60; goes from 40 to - 5 mph. (in strong wind).



● Hold your hats—Al Gifford of Las Vegas, Nev., says this is a radio-controlled, jet-powered free flight F-80A. He built model, Bob Durling machined home-made jet engine and C. Casey developed the r-c unit. Span is 35 inches. "New Durling 002" being made.



● One inch to ft. copy of Betty Skelton's "Little Stinker II" by P. Donovan-Hickie, Surrey, England. Powered by 3.5 cc Amco gp motor; U-control; 16 in. span; weight, 14 oz. Ailerons on 3rd line.

mph averaged during those 6 laps. For slow speed judging after the contestant has cut down his speed satisfactorily, he signals the judges to start timing again. He's then clocked for 6 more laps, with the stern of the carrier deck serving as reference point for each lap. You'll get 1 point for each mph difference between your average 6-lap high speed and 6-lap low speed.

Okay—you've completed your flight, now for the landing. You need an arresting hook or similar device to engage the arresting gear on the deck. This gear will consist of wires or cords stretching across the aft (rear—to AF leads) end of the deck for distance of 40

tary aircraft. This sort of cancels out the opening rule under design requirements: "Scale models of existing naval aircraft . . ." This means, according to a Navy spokesman, that you can use a British carrier plane, for instance, or Navy-ize an Air Force ship with arresting gear. Non-scale entries will be accepted, but they'll receive no "bonus" scale points. Your total points will be the sum of the launching, high-speed, low-speed, landing and bonus scale accrued in one flight.

You'll get up to 5 minutes to get your model onto the carrier deck and into the air. Three attempted launchings allowed, with a launching considered

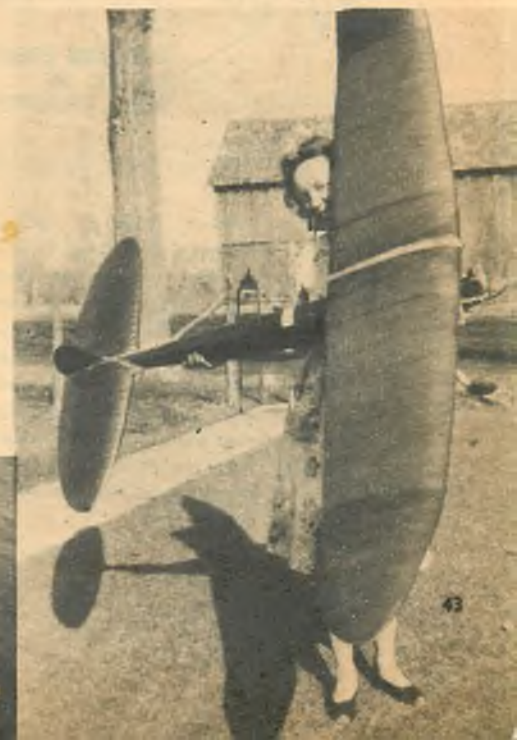
● Mrs. Elwyn E. Carver, Montpelier, Idaho, peeks around wing of hubby's Sailplane. Model racked up 74 flights before it went OOS, was found by hunters who returned bits. Super Cyke power.

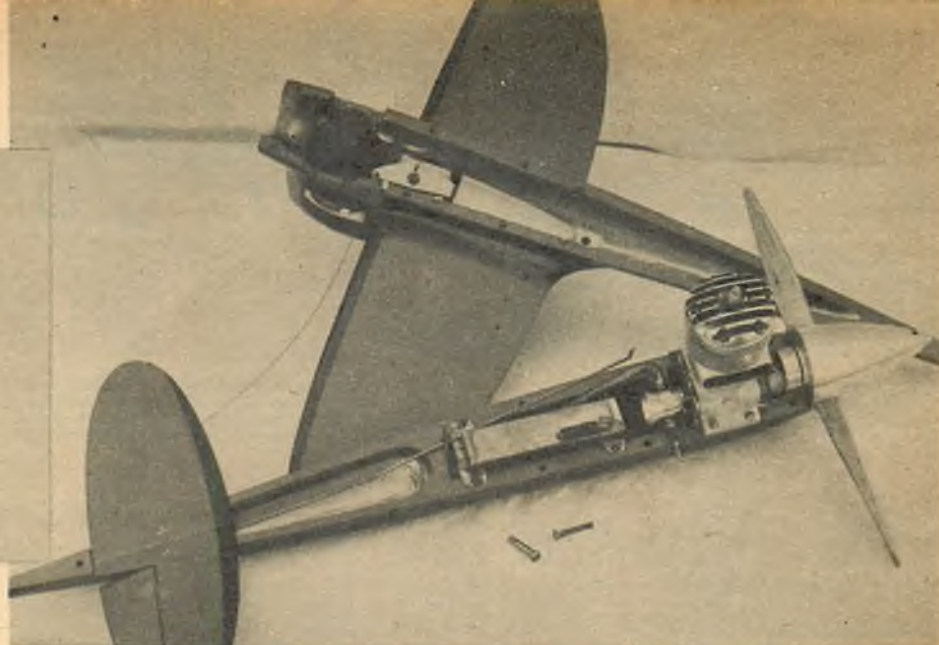
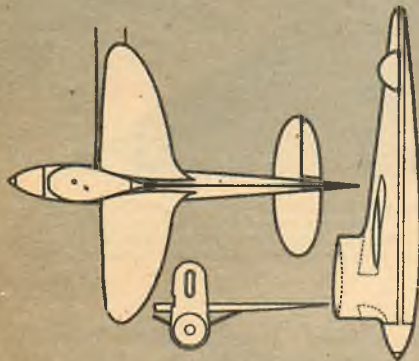


● Howard Rubin, Bronx, N. Y., turned out this McCoy 29, powered Key proto-team racer. Ship performed in Mirror Model Flying Fair. Neat color scheme gives zip. Plymouth meet has added team event.



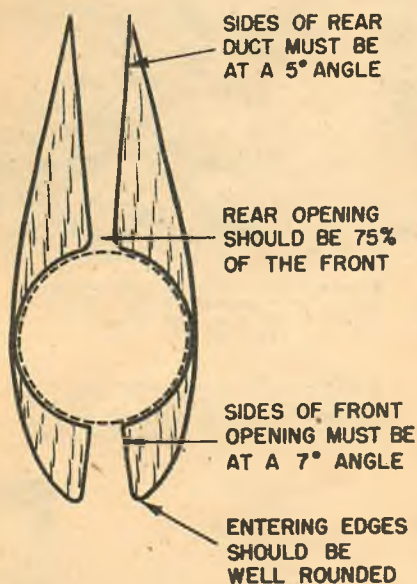
● Something new in towline gliders. Walter Mansfeld, Pittsburgh, Pa., wants plenty of room for take-off, so makes ROW semi-scale glider with realistic, dummy motors. Span is 6 feet. Wing pontoons work fine. Well-doped, waterproofed flier is natural for off-water operation.





● This is deBolt's record-setting 152.45 mph Class D speedster. Weighs only 6 oz. less tank and motor. Features pressurized fuel tank, McCoy 60 Series 20 whittled down, full-length maple crutch.

150 mph... PLUS!



● Cowl design (above) utilizes "steam jet principle" outlined to Buffalo speed fans by engineer Bob Wood of Bell Aircraft. Air is rammed into cowl, heated by engine and expelled out the rear at a higher velocity than which it entered cowl. When properly applied the thrust developed more than offsets the actual drag of the cylinder itself. But the precise figures must be followed.

All the "secrets" of the top flight speed men revealed—Part I

By HAROLD deBOLT

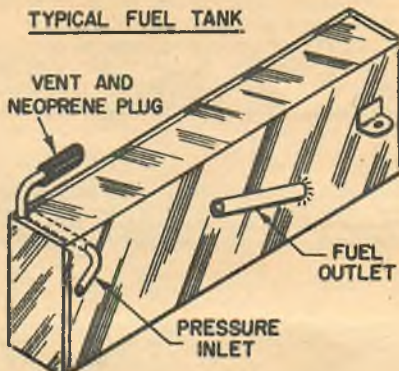
EVERY model builder has some goal that he would like very much to achieve. It may be a long thermal flight, a national record or perhaps a perfect stunt flight. However, I would venture to guess that there is not one speed flyer who has not at some time hoped for a 150 mph official flight.

Last winter I decided to concentrate upon the problem and see if I could conquer 150. The results were most gratifying with my first official flight of the season being 155.16 mph. I would like to de-

scribe the manner in which I tackled the entire problem hoping that it might benefit others.

In the fall of 1948 I sat down and analyzed the winning models of that year and available power plants. From what had been done during the season it was apparent that the model would have to be rather small and light in weight. All fast flights had been on lines of .012 diam. or less, so it would be necessary to hold the model down to 24 oz. or below to use such size lines. From past experience I placed the wing area at 40 sq. in. and upon checking with my other models found that this just about equalled (Continued on page 70)

TYPICAL FUEL TANK



MC COY REAR COVER



By HENRY STRUCK

How can you pass up this one? One of history's most famous planes as a control liner or free fighter



THE epic transatlantic solo flight of Charles A. Lindbergh stands to this day as the most inspiring and dramatic achievement in the spectacular history of aviation. On May 12, 1927, then a virtually unknown young airman, he set down his silver ship at Curtiss Field, Long Island, to complete a one-stop jaunt across the continent and calmly announced his intention to fly on to Paris. Quickly he hopped his ship to nearby Roosevelt Field where Clarence Chamberlin and Commander Byrd were preparing their craft for the same test.

Early on the morning of May 20, "Lindy" eased his long frame into the tiny cabin and lifted the heavily loaded ship from the soggy field in an almost incredible take-off. Barely clearing high-tension lines at the edge of the field, he disappeared into the mists. Twelve hours later he was over St. John's, Newfoundland, the "jumping off place" for the journey across the sea. Fighting blindly through fog banks, now skimming at wave-top heights to escape icing, again climbing to 10,000 feet to



top rain squalls, he finally emerged into clearer weather near the Irish coast. After checking his position he sped toward the English Channel and Paris beyond. Thus, at the end of 33½ hours of relentless tension he landed in the brilliance of flood-lighted Le Bourget airdrome, a hero to all the world.

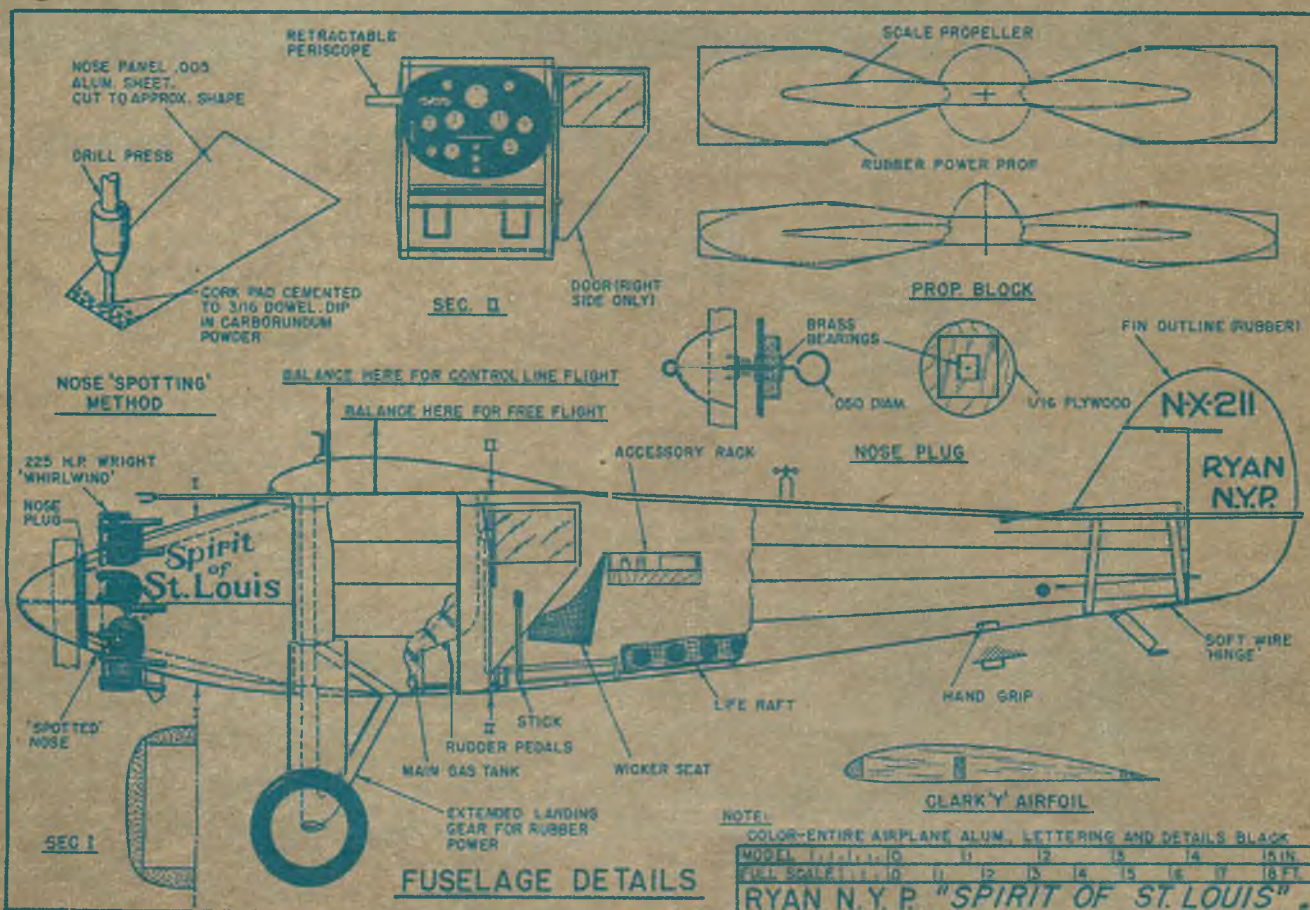
Accepting the responsibilities of his new position upon returning to America, he flew a 20,000-mile Good Will tour, including a 2000-mile non-stop flight from Washington, D. C., to Mexico City. At the conclusion of this mission the Spirit of St. Louis was presented to the Smithsonian Institution, where it hangs today beside the original Wright Biplane, the first machine to achieve powered flight.

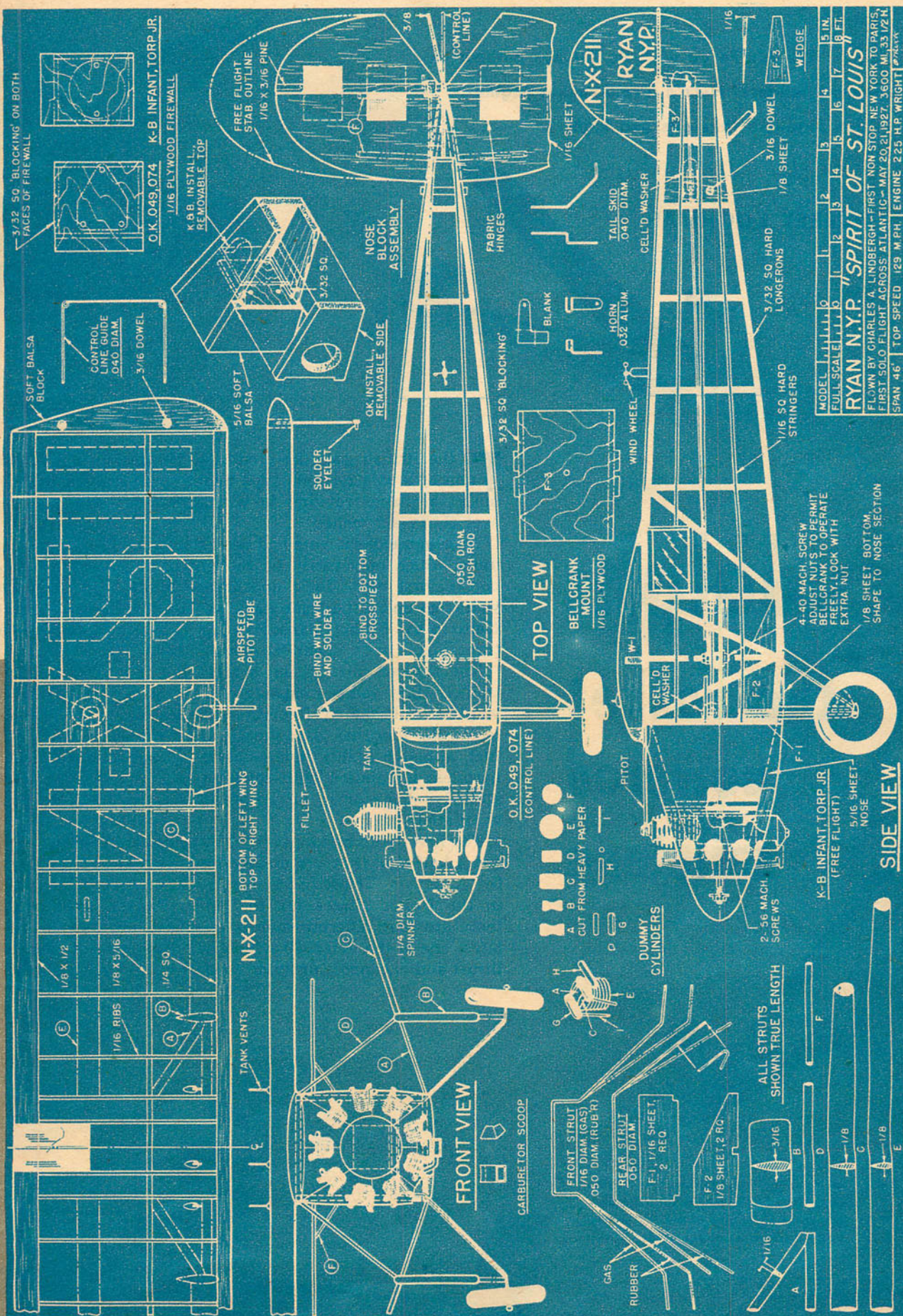
Essentially a modification of a sturdy mail plane built by the Ryan Aircraft Company of San Diego, Calif., the N.Y.P. was nevertheless a great step forward in design. Utmost consideration was given to streamlining every possible part. Instrumentation

was the best available at the time. The Wright Whirlwind engine chosen to power the ship was to establish itself as one of the finest types ever built. Brought to life under the skilled and daring hand of "Slim" Lindbergh, the combination could not fail.

Our model is scaled ⅝" to 1", and presented in three versions: as a control line flyer with the Herkimer O.K. Cub .049 or .074, as a free flight gas with the K&B Infant or Torp Jr., and with the old reliable rubber power. (For information on building a .29 "Spirit," see end of article.) Construction is identical for all types with a few minor changes to accommodate the various power plants, to be noted as the description progresses. In spite of the absence of dihedral the model performs realistically in free flight, unless of course, overpowered. The broad, sloping wing struts apparently provide effective dihedral.

Assemble the basic fuselage (Continued on page 74)





ROLL	SCALE	1	2	3	4	5	6	7
RYAN	N.Y.B.	"SPIRIT OF ST LOUIS"						

FLYING BY CHARLES A. LINDBERGH—FIRST NON STOP NEW YORK TO PARIS,
FIRST SOLO FLIGHT ACROSS ATLANTIC—MAY 20, 21, 1927. 3600 MI. 33 1/2 H.
SPAN 46' TOP SPEED 129 M.P.H. ENGINE 225 H.P. WRIGHT ²⁰⁰⁰

The Air Force with its X-1 has nothing on the model builder! Here's a real rocket engine for Jato-like take-offs and flight

By AUBREY KOCHMAN

Rudolph: the rocket powered sailplane



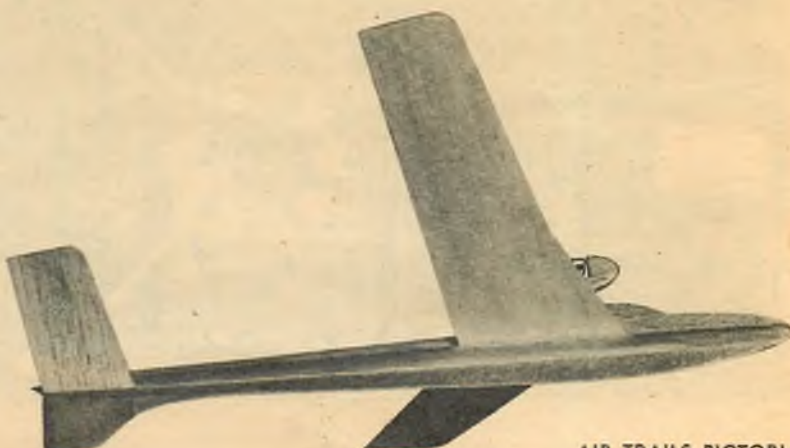
● He's an innocent-looking little chap, isn't he? Wait till you "fire up" the Jetex 50 engine and Rudy shoots upward like a homesick eagle. Wow!

TO the British goes the credit for the design and production of a true reaction type motor small enough to power model airplanes ranging in wingspan from nine inches to over thirty-six inches.

Although experiments had been started in 1945, these "jet" units, which may easily be thought of as miniature "Jato" bottles, first made their appearance in England about two years ago under the trade name of "Jetex." They are manufactured by Wilmot Mansour & Co. Ltd., and approximately three years were spent in developing the basic idea.

The task of formulating a solid fuel that would be extremely light and yet capable of generating sufficient thrust was accomplished by Imperial Chemical Co. Ltd., who perfected the fuel that is now used in all the Jetex units. This fuel, although highly inflammable, is not combustible. It is harmless if handled with common sense but should not be ignited indoors or in any confined space without adequate ventilation.

The first Jetex motors arrived in this country about a year and a half ago; they are now being imported and distributed by American Telasco, Ltd., who are sole representatives in the United States for the units. At the present time there are four different motors available. The smallest and latest one is the Jetex 50 which develops one-half ounce of thrust and is capable of flying models up to twenty inches in



AIR TRAILS PICTORIAL

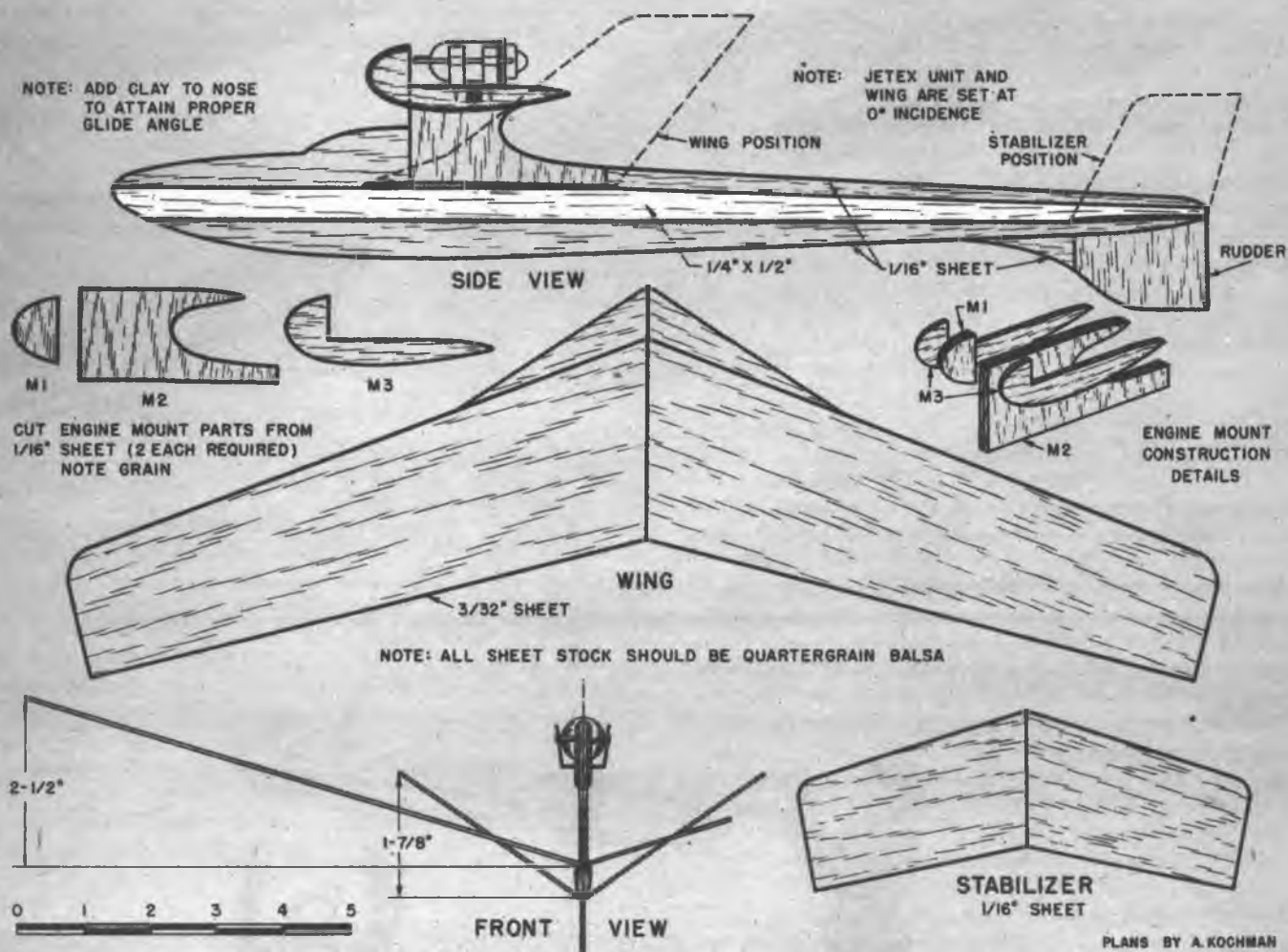


wingspan. The initial cost of the motor is the least expensive of any power plant, and that motor is extremely simple to operate.

The hissing sound heard when the charge is ignited is made by the expanding gases exhausting through

a tiny aperture at supersonic speed. The size of this aperture is very critical. As little as .001 inch change in its size will result in a very noticeable loss of thrust. The manufacturer supplies a piece of wire of the correct diameter, and only this wire should be used in keeping the aperture clean.

For those who believe it is the force of the escaping gas pushing against the atmosphere that imparts forward motion to the model, a simple and non-technical explanation will give a better understanding of what actually does provide forward push or thrust. A jet or reaction motor operates on the principle of Newton's third law of motion, which states that to every force there is an equal and opposite force. Therefore a flow of gas through a nozzle, or jet, requires a force to give it velocity. This force which is pushing the gas out through the jet creates an opposite force of equal power (Continued on page 62)





Lt. Russell L. Maughan spanned the continent in this fleet forerunner of the famous Hawks series

Curtiss XPW-8

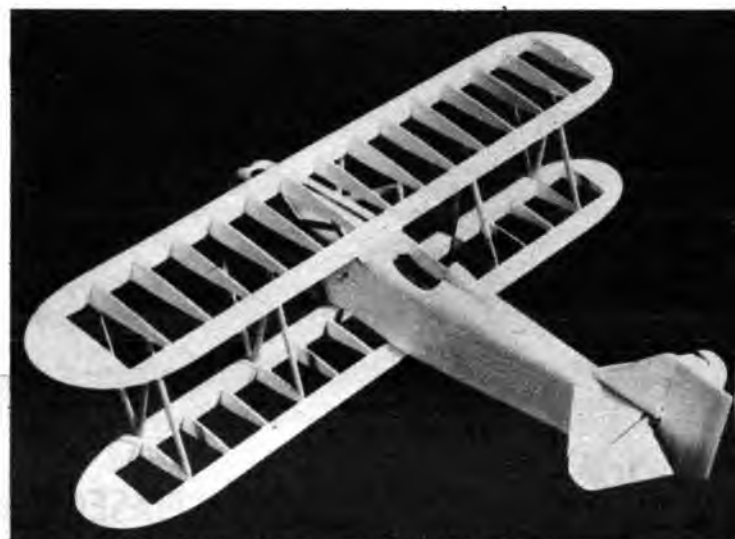
By WARNER FRAKE

URING the years immediately following the end of World War I, the military services of the United States encouraged the development of racing planes and the Pulitzer Trophy Race resulted in some keen competition between the Army and Navy.

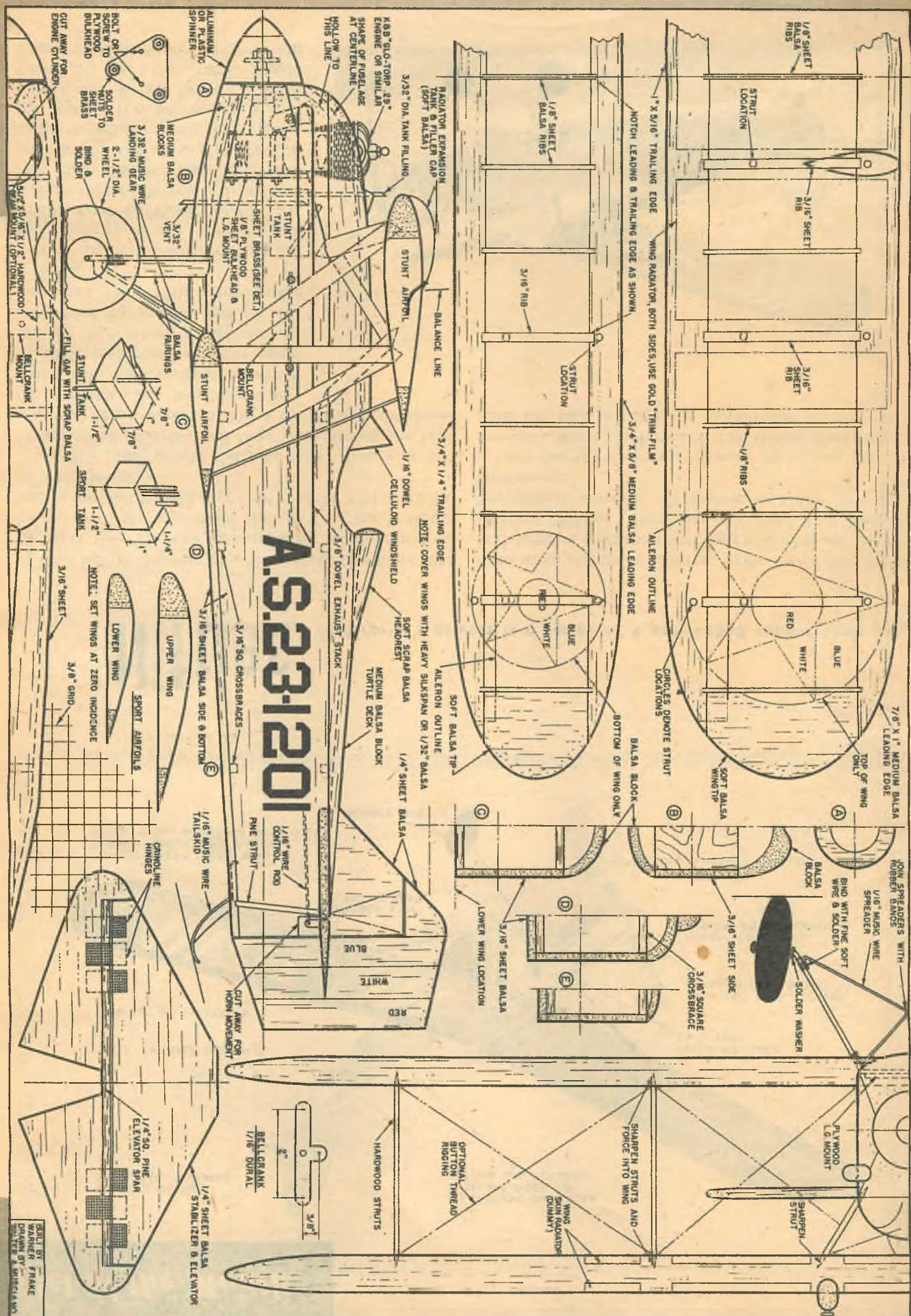
Considerable design experience was gained from the Navy Curtiss R2C and R3C racers while the Army learned much from its Curtiss R-6 and R-8 racers. The results of this experience were incorporated in a newer Army model in 1923. This plane was the Curtiss XPW-8 and was powered with a Curtiss D-12 "V" type liquid-cooled engine of 440 hp. Although only three planes of this type were built, the U. S. Army ordered twenty-five slightly modified (*Continued on page 68*)



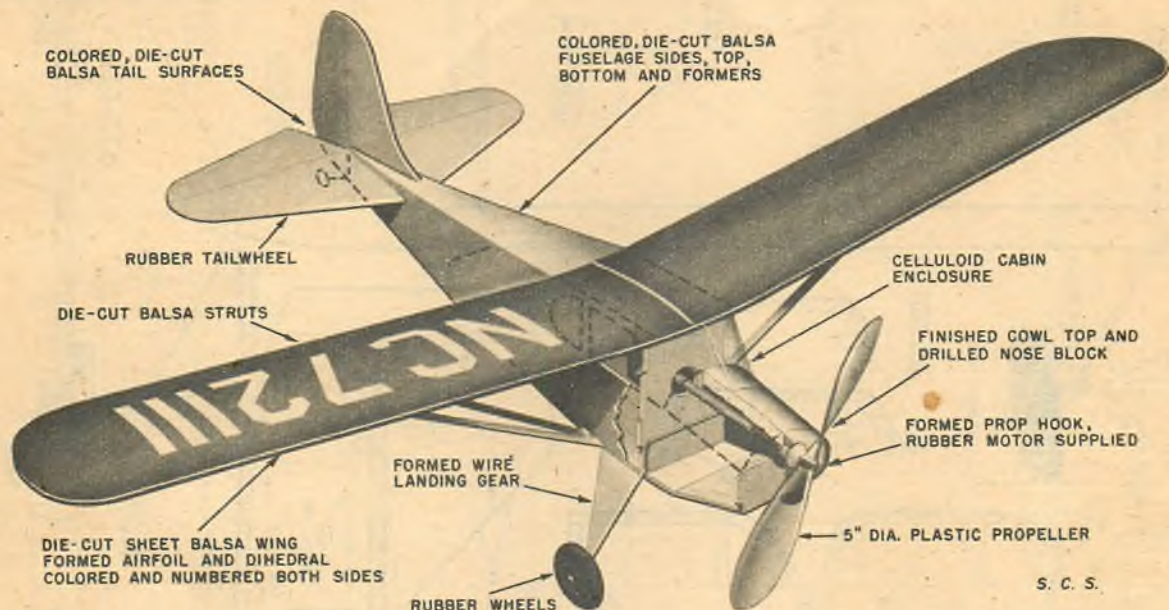
● Construction is a cinch: sheet slab sides, wings have no dihedral or sweepback. Goes low 'n' slow on a .19; hot as blazes with a .49.



● Choice of airfoils is offered—stunt fans should use the symmetrical section; Sunday flyers will probably stick to the sport section.



Model of the Month



S. C. S.

Nifties

Enterprise's newest is a series of 4 pre-fabbed rubber scale jobs

JUST before the war, at a time when free flight kits were the rage, one manufacturer set the trade on its ear with the statement that 93% of his business was in ten and twenty-five cent models. Flying scales, in other words!

But the same fellow sadly admitted that nine out of ten of his models—and they were among the best—never were completed. For a couple of generations the American boy has been fascinated with model airplanes which in some instances not only could not fly but which could not be assembled by anyone but an expert, and then with considerable difficulty.

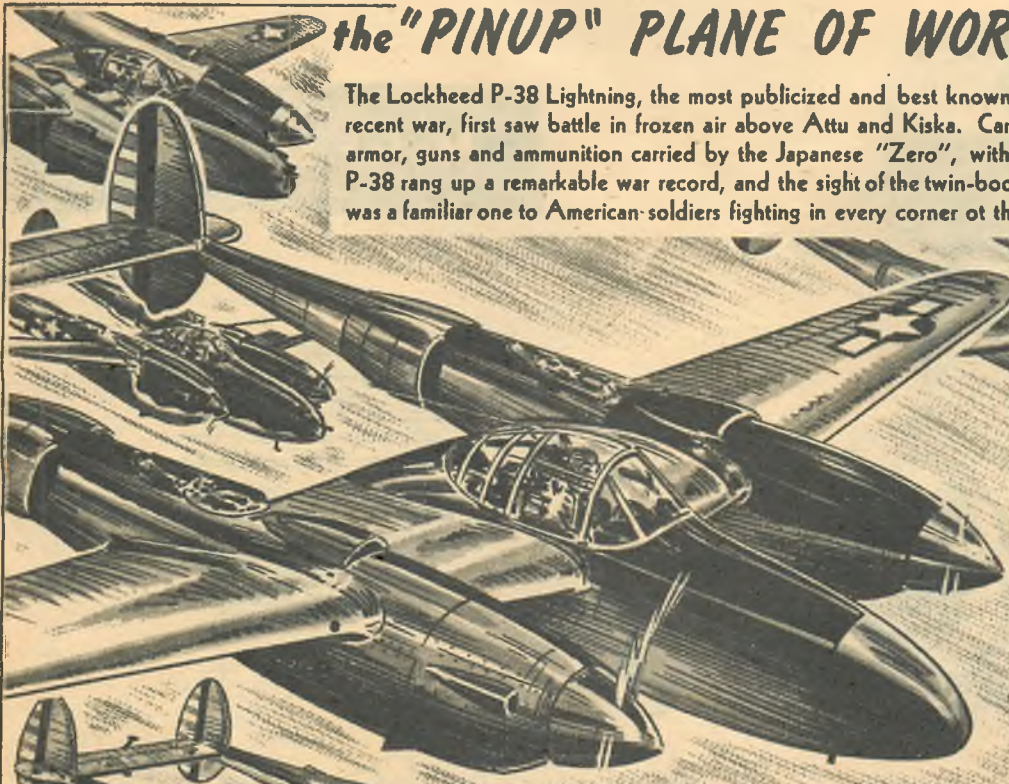
Now that prefabrication has hit the less expensive flying scale model field anything might, and does, happen. There's a boom on. Ask any dealer! Not only are youngsters swallowing production as the desert absorbs a shower, but the models themselves are a lead pipe cinch to put together. With variations on the same magic theme manufacturers are rushing

in to stake claims at different price levels. The latest is Enterprise with their first four of a fifty-cent series. Dubbed "Nifties," these are the Piper Cub Special, Taylorcraft, Aeronca Champion, and the perennial Monocoupe.

Let's for the moment consider what you get for four-bits. What you notice first on sliding the contents from the box is the large (Continued on page 88)



the "PINUP" PLANE OF WORLD WAR II!



The Lockheed P-38 Lightning, the most publicized and best known fighting plane to come out of the recent war, first saw battle in frozen air above Attu and Kiska. Carrying five times the weight of the armor, guns and ammunition carried by the Japanese "Zero", with which it was often matched, the P-38 rang up a remarkable war record, and the sight of the twin-boom, twin-engine, twin-tailed fighter was a familiar one to American soldiers fighting in every corner of the globe.

Build A 36" CLEVELAND Model for:

- CO2 \$
- Rubber
- Half-A

2

BUILD THESE OTHER FINE ONE-DOLLAR KITS TOO:



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GRUMMAN PANTHER


These one-dollar kits have won deserved popularity everywhere, as they build true scale, flight engineered models. They are made especially for the modeler who will not compromise on quality and realism, but who wants simple construction, low price, and contest performance. Almost all "IT" models are of 30" wingspan, a convenient and efficient size. They may be powered with a variety of rubber: CO2, glow plug, and jet motors (depending on the design chosen). More airplane for less money just cannot be found.

HOW TO ORDER: See your local hobby dealer first. If he does not have these kits, do not accept substitutes but order direct. Include 25c for pack-post. (35c West of Rockies, APO's and U. S. Possess.) Min. order \$1.00 plus postage. No C.O.D.'s accepted. Special Delivery in U.S.A. only, 25c extra. Foreign countries add 20% for special handling, etc., in addition to 25c pack-post. charge. (Ohio residents: add 3% sales tax.)
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20" AERONCA SEDAN



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Span 28" — \$2.25



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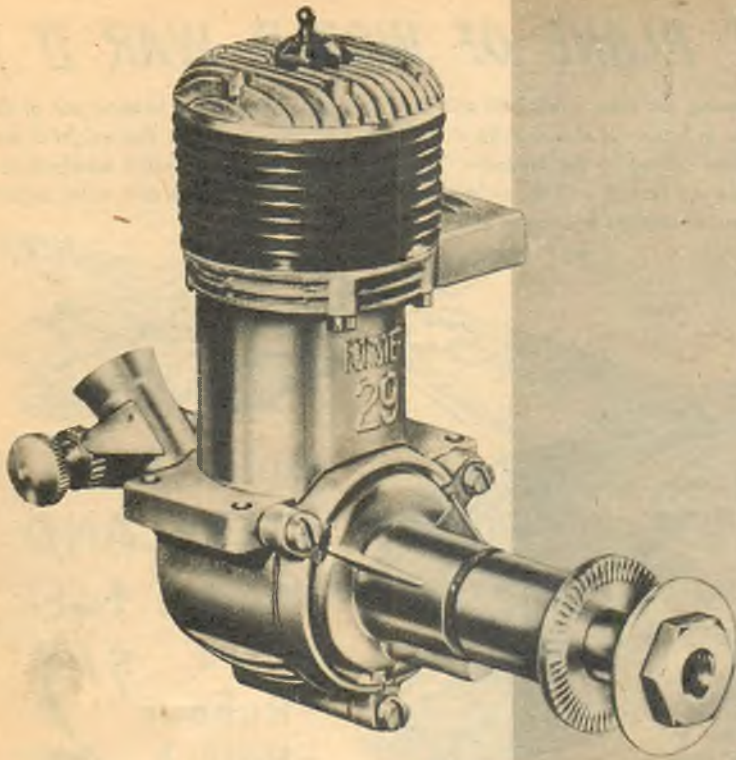


SPAD XIII
Span 19" \$2.00

NOTE: All models shown on this page are suitable for tiny glow plug motors.

CLEVELAND MODEL & SUPPLY CO., 4156F2 Lorain Ave., Cleveland 2, Ohio. World's Finest Models Since 1919

Motor of the Month



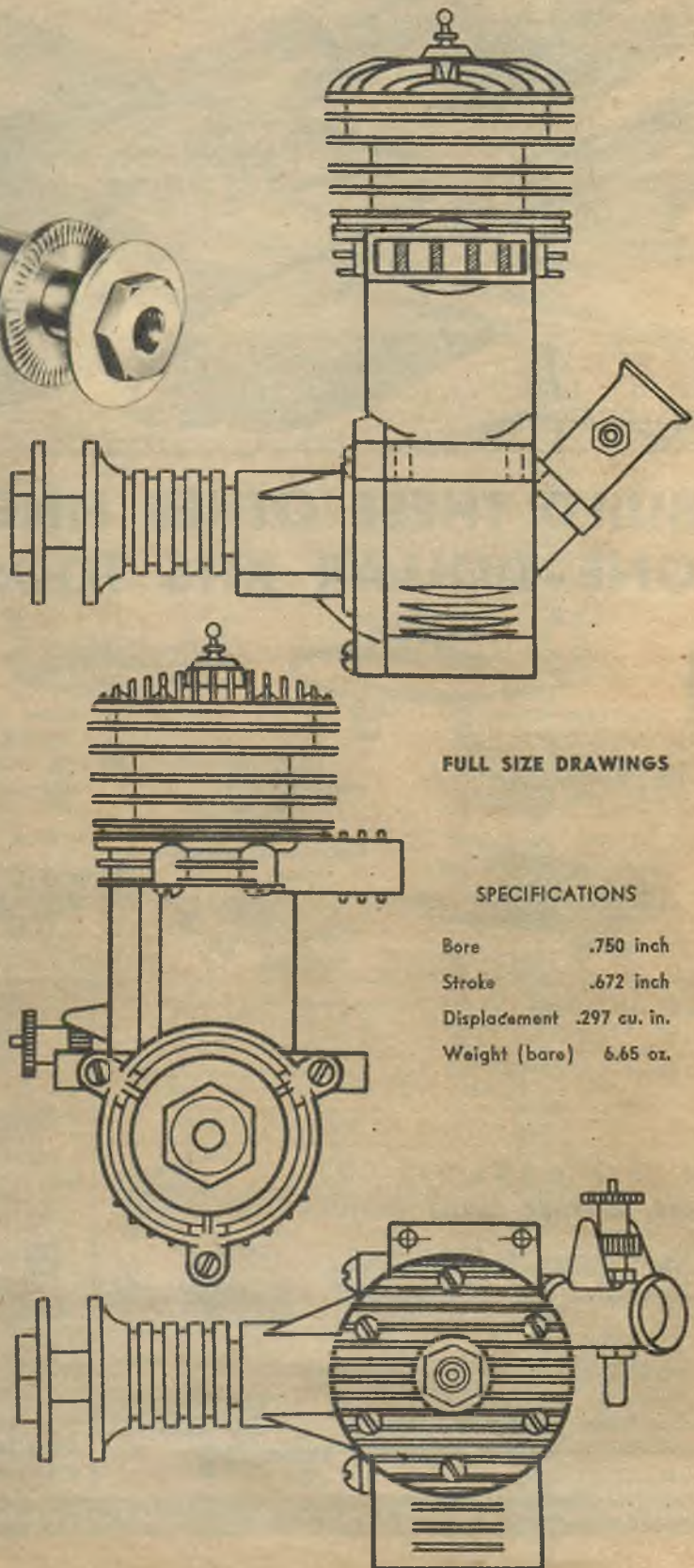
Forster 29

Long prop washer and extended shaft distinguish new glow plugged G-29

KKNOWN for its dependability and ease of starting, the Forster "29" ignition model has been a popular engine with the free flight boys as well as early control-line enthusiasts. The latest model, a glow plug engine designated the "G-29," being manufactured by Forster Brothers of Lanark, Ill., one of the older model motor makers still active, now makes its bid.

In general outward appearance this new engine is somewhat like its predecessors. It features a disk type rotary valve with the intake venturi at the rear of the crankcase. However, instead of entering the crankcase at a 90 degree angle as on previous models, the venturi now enters at approximately a 50 degree angle. This change in angle gives some of the advantages of a downdraft carburetor, and coupled with an increase in the diameter of the venturi throat and the inlet valve, has added greatly to the volumetric efficiency of the engine. The changes are responsible for improved performance.

By substituting an aluminum piston employing two (Continued on page 82)



FULL SIZE DRAWINGS

SPECIFICATIONS

Bore	.750 inch
Stroke	.672 inch
Displacement	.297 cu. in.
Weight (bare)	6.65 oz.

Blue Blazer is back!!



...for 10 years America's largest selling economy electrical ignition fuel, Blue Blazer now is better than ever as a snappy, broad-range glow fuel.

Made specifically for SPORT and STUNT OPERATION.
New Blue Blazer gives you . . .

- More revolutions and longer operation per tank full
- Lower fuel cost
- Easy starting and simple fuel valve adjustment

Now, in response to the demand for a stable, reliable glow fuel that will give longer operation in sport and stunt flying, Blue Blazer returns to the market with a vastly improved formula.

A laboratory research fuel for 14 years, Blue Blazer is subject to the same rigid quality control tests that have won for Francisco fuels the confidence of racing fuel users everywhere.

All Francisco fuels are tested gallon by gallon — no bulk tanks to accumulate sludge and permit oxidation deterioration. Only Francisco fuels contains the secret inhibitors and detergents that resist aging, plus the finest degummed castor oil produced by Francisco's exclusive process.

New Blue Blazer is now on your dealer's shelf, ready to make this season's flying the best ever.

For the utmost simplicity consistent with good performance, Blue Blazer is made in two types which give good operation through the entire range of engine compression ratios.

No 1

Favors medium and low compression engines. Relative humidity 60% or lower, not critical. Calorific heat value is higher than straight methanol base fuel; gives long duration of operation and more revolutions

per tank full. Treated, degummed castor oil has less viscosity drag than cold pressed castor oil. Resists curdling, souring, deterioration. Non-sludge forming. Contains 5 chemicals, 3 solvents, 3 detergents, 2 alcohols and 2 nitrates. Packaged in pints. List price: Western, \$.55 — Eastern, \$.60.

No 2

Most complete combustion in medium and high compression engines when relative humidity is above 40%. Snappy, clean, high percentage combustion in all engines. Contains Francisco's exclusive degummed treated castor oil and gallon-by-gallon purity tested alcohols. Also contains 3 solvents, 6 chemicals, 2 inhibitors, 3 detergents and 3 nitrates. Packaged in pints.

List price: Western, \$.65 — Eastern, \$.70.



Now Ready!

Our new booklet, "Contest Fuel At Its Best," containing a wealth of valuable information for every user of model engine fuels is now ready for distribution. We are sorry that the problems incident to getting New Blue Blazer ready for this season's market delayed its publication and apologize to those who have had to wait for their copies. If you haven't yet requested one of these interesting fact-filled booklets, ask your dealer or write direct.

FOR MORE FLYING, MORE FUN FOR YOUR MONEY—GET BLUE BLAZER

FRANCISCO LABORATORIES

3787 GRIFFITH VIEW DRIVE • LOS ANGELES 39, CALIFORNIA

All-American

(Continued from page 40)



**For tops in turns...
for peak performance...
for fun or fame!**

Insist on



T-56



The Power of Champions!

UNITED STATES RUBBER COMPANY

1230 AVENUE OF THE AMERICAS

NEW YORK 20, N. Y.

one the All-American (see construction plans). It is a composite of famous pylons and, for the average, includes the ideal aspect ratio, moment arms, areas, and weights. This is an A job with a big engine in its class.

The American's span is 54 inches, its wing area 384 square inches. The stabilizer area is 38½% of the wing area and the tail moment arm is 39% when figured from midchord of wing to midchord of stab. Glow ignition is used but if the ship is built as shown with light covering it will be underweight, permitting the addition of any timers and gadgets without penalty. And it won't be at a disadvantage if you prefer spark ignition. While the fuselage was built up of both vertical and horizontal sheet balsa keels and bottom, with sheet siding, a built-up "box" could be substituted. Although a flat-bottomed, fairly thin airfoil was used (many builders believe this is the best means of getting maximum altitude) glide is exceptionally good. It would be difficult to achieve more of a floating glide without making the ship impractical for even a moderate wind.

If you look for rule-of-thumb clues for your next model, these five ships cover the ground fairly well. But, if you are a real individualist you can at least use them to hit upon something different, for these are the machines you have to duck to be different! While the pylon is the king it is not necessarily fatal to try something else.

"The trend seems to be towards long, skinny, weak pylon jobs," says individualist Don Foote whose Westerner is a potent contender in a wind—or calm! "The big beef about old rules was that they did not allow experimentation, yet, now that we have a free hand, there is a terrible lack of originality. It takes crashed airplanes to get the bugs out of a new design and the fellows just haven't the spunk to develop a radically new design.

"Most ships," continues Don, "use too much stabilizer area and far too much vertical fin. Since cross section rules were abolished, designers seek more stability by lengthening the moment arm. It is an unfortunate fact that they are doing just the opposite of what they should do for greater stability. Long moment arms have advantages, but these are outweighed by their disadvantages. When wing loadings first came off, I built a ship of tremendous proportions. It gave good results but was too slow on the climb and took all the fun out of flying."

In the Northwest Earl Cayton explains that most fellows are still flying about the same jobs they had in 1947. Ignition motors in Zippers, Interceptors, Powerhouses, and Sailplanes are typical.

"We saw great numbers of 'new look' jobs in 1948," says Earl, "with glow motors and super wing areas, but these frail jobs weren't strong enough to fly long at contests under all conditions and smeared sooner or later. Most of our jobs still have about seven ounces per 100 square inches of area and most of us prefer to put our area in the wing and use 'one-third' stabilizers."

In the Oklahoma City area where a national reputation has been built these last few years, Ray Mathews says, sizes are running to about 450 square inches for the old Class A, 600-750 for the old

Enterprise's

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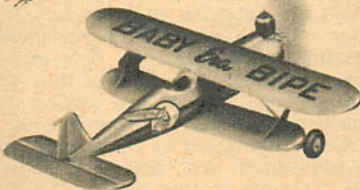
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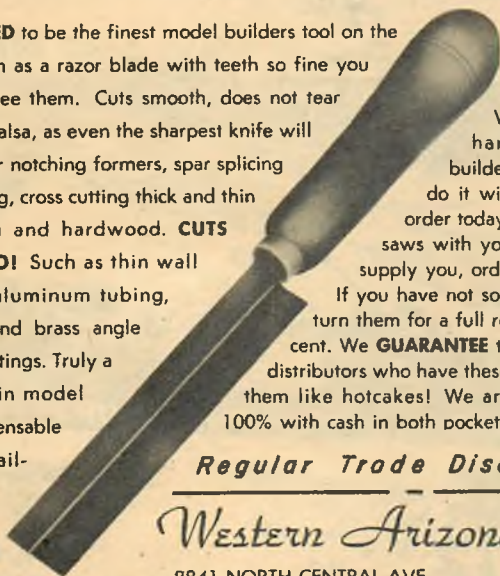
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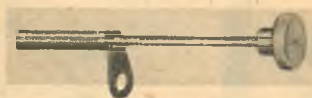


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B, 900 for C, and 1200-1500 for the D's. Wide experience with half-A indicates that best areas lie between 140 and 170 square inches, with the smaller end of the scale producing somewhat higher climbs and the upper end a floating glide.

While the play-it-safe contestant will stick to his pylon, other possibilities for winning machines still exist. At a recent British Nationals, Continental machines well nigh ran into the ground American and English designs. One of the most sensational of these machines was the Flanders Flyer type, a box with shoulder-mounted tapered wings, featuring extreme downthrust of about 20 degrees (that is no misprint!) and a pendulum device to control the rudder against spirals. Climb was high, fast, and straight. No freak, this design has consistently proved itself one of the world's best.

A great many Continental designs are variations of the basic shoulder wing shown in our collection of "models of models." While Gaston Joostens' Flanders Flyer, despite a normally high thrust line, incorporates tremendous downthrust, others, notably the Swiss, have installed inverted engines quite high in fully enclosed cowlings so that the thrust line runs well above the chord of the wing. The fuselage then sweeps down swiftly to the familiar low stabilizer. Very squat, small twin fins are frequently used.

It is highly probable that refinement by our own builders on the shoulder wing theme would offer an intriguing avenue of progress in addition to the thirteen-year-old pylon theme. It seems likely that such shoulder wings would feature relatively small stabs (say one-third wing area), 45-50% moment arms, except in the larger sizes, 50% chord balance point and symmetrical or low-lift tail sections.

What should you build? That's largely a choice of weather and taste. If you are a pylon man there are at least those three variations on the theme: the long job, the short job, and the middle-of-the-roader. If you don't like pylons, there's the hatchet or the shoulder wing. If you are experimentally inclined, the latter offers a number of yet untried variations, such as the Belgian and Swiss examples. Considering that wing loadings run about five ounces per square foot in half-A; from five to ten in A, averaging out at 7-8; pretty much the same in B; and eight or more in C, it is a simple matter to establish sizes and shapes with the aid of the accompanying three-views.

PHOTO CREDIT LIST

Page 12—A. Raspet.

Page 14—Breda BZ.308: H. Levy; Fairey 17: Fairey Aviation Co. Ltd.

Pages 21-22-23—CAA, United Airlines, Consolidated-Vultee, Wright Aeronautical, Lockheed.

Page 26—Wide World.

Page 30—Delmar Pendley.

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Page 36—T: Walter T. Smith.

Pages 48-49—Bob Tucker.

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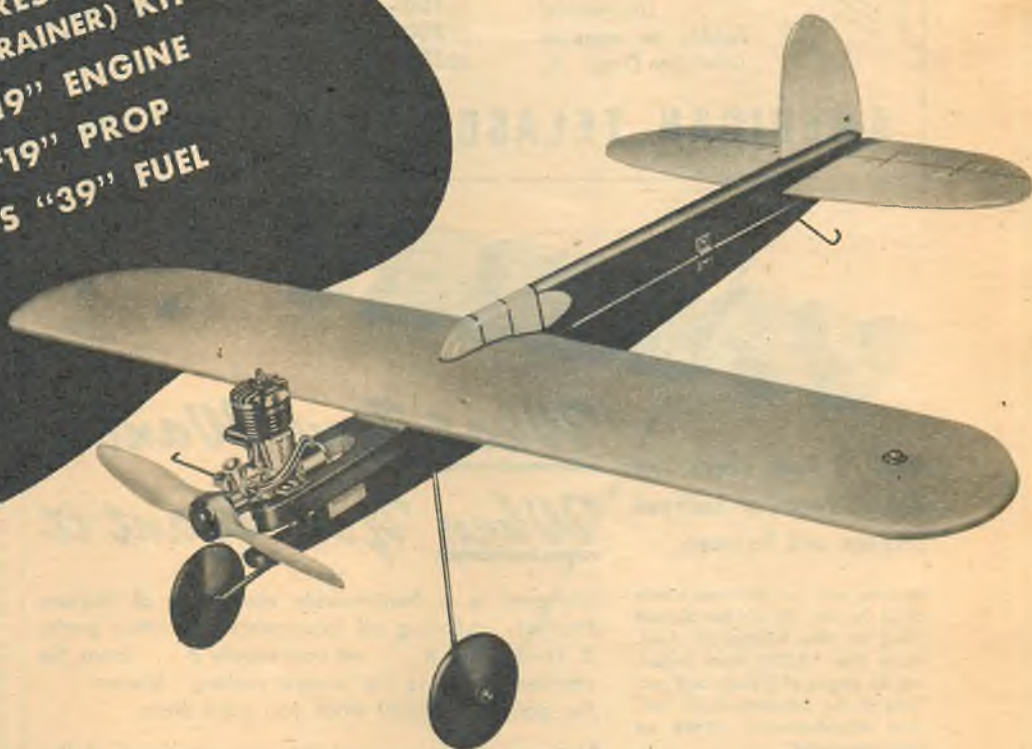
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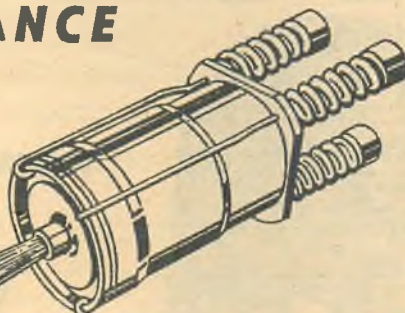
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Rudolph

(Continued from page 49)

which pushes in the opposite direction—against the inside of the container forcing it forward. It is therefore this "hidden" force that actually propels the model forward and not the gas that is being forced out the other end.

The model presented herewith is basically a hand-launched glider. This type lends itself to experimental work with the Jetex 50. Before starting construction, bear in mind that the finished model should be as light as possible. Therefore it is recommended that quarter-grain sheet balsa be used. This cut of wood is easily detected by its mottled appearance and is quite stiff as compared to ordinary straight-grained balsa. It is also much more resistant to warps. An additional saving in weight may be accomplished if 1/16" sheet is substituted for the wing stock. However, it was felt that a better airfoil could be sanded into the 3/32" sheet as shown on the plan.

Start construction by shaping the 1/4"x1/2" fuselage "stick" shown on the side view (without any gray tone). Note that only the top edge of the stick is tapered. This taper starts at the trailing edge of the wing. The bottom edge of the stick is perfectly straight back to the leading edge of the stabilizer, where it is tapered 3/32" to give the stab a negative angle of incidence. Build the wings and stabilizer next and cement them to the stick, making certain that they are lined up properly. The motor mount is built up from laminations of 1/16" sheet. Note the grain direction. The only important point to keep in mind is that the mount must line up perfectly with the wing—in other words, have zero degree incidence and neither right nor left thrust.

Next add the 1/16" sheet "silhouette forms" to the top and bottom of the stick and the 1/16" sheet rudder. When cementing on the rudder, do not apply any cement for the last half inch at the trailing edge. This will make it easier to warp for turn adjustments. Round off all square corners and apply a coat of either sanding sealer or glider polish. Mount the Jetex holder in its proper position, using the two wood screws supplied and then a strip of cloth as shown. The addition of the cloth is very important and should not be overlooked.

Due to the extreme lightness of the finished model all tests should be made on a calm day. Gently hand glide. In all probability a small amount of clay added to the nose will be necessary. In attempting power flights, do not heave the model into the air or launch it before the motor is developing sufficient thrust. The correct launching technique is quite simple. Ignite the fuse (wick) with either a match or the lighted end of a cigarette, wait a few seconds for a strong hissing sound and then very gently launch the model with its nose pointed slightly downward. When the model leaves your hand it will start out in a normal glide path for fifteen or twenty feet and then, as the thrust increases, it will start climbing in lazy circles with the diameter of the circles decreasing until the model is spiraling almost straight up.

In loading the motor, handle both the fuel charge and the fuse as little as possible. Both these parts seem to absorb moisture and sometimes the

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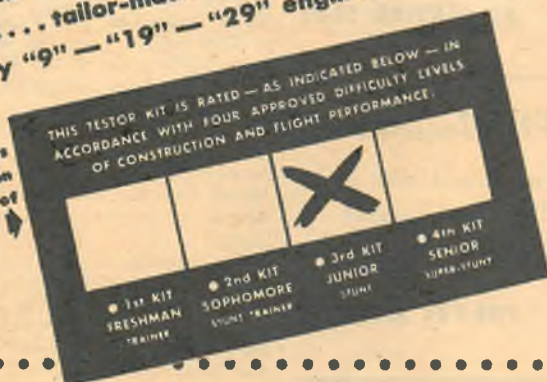
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JUNIOR "9" FOR THE MCCOY "9" AND OTHER CLASS AA ENGINES • Hardware and wood parts: completely prefabricated • Wing construction: hollow — all balsa • Wing type: symmetrical airfoil — tapered • Wing span: 27 in. • Wing chord: 6 in. • Wing area: 135 sq. in. • Fuselage construction: hollow — all balsa • Fuselage type: semi-scale — cabin • Overall length: 20 in.



JUNIOR "19" FOR THE MCCOY "19" AND OTHER CLASS A ENGINES • Hardware and wood parts: completely prefabricated • Wing construction: hollow — all balsa • Wing type: symmetrical airfoil — tapered • Wing span: 34 in. • Wing chord: 7 in. • Wing area: 200 sq. in. • Fuselage construction: hollow — all balsa • Fuselage type: semi-scale — cabin • Overall length: 26 in.



JUNIOR "29" FOR THE MCCOY "29" AND OTHER CLASS B ENGINES • Hardware and wood parts: completely prefabricated • Wing construction: hollow — all balsa • Wing type: symmetrical airfoil — tapered • Wing span: 40 in. • Wing chord: 8 in. • Wing area: 280 sq. in. • Fuselage construction: hollow — all balsa • Fuselage type: semi-scale — cabin • Overall length: 30 in.

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"National Champions"

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A NEW PACE FOR SPEED FLYING WILL
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The original and only
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As modern in design as a new car, as easy to fly
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Kit comes with all parts completely fin-
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The only all balsa stunt model in its class!
The most rugged and flyable 1/2A stunt mod-
el available. High lift wing gives superior
performance with the small bore engines,
all balsa construction provides ruggedness.

ASSEMBLE IN ONE EVENING \$1.75

charge will not ignite. Incidentally,
don't attempt the full 15-second motor
run in any area where you would not
fly a gas job for a similar length of
motor run. These Jetex jobs have a
habit of flying out of sight.

Bill of Materials. Because balsa
wood is generally sold in 36-inch
lengths, you will need to purchase only:
one sheet 1/16"x3" for stabilizer, rudder
and fuselage. One sheet 3/32"x3" for
wing. One piece 1/4"x1/2" for fuselage
main stick.

Lindbergh

(Continued from page 27)

didn't consider the operation to be
quite that simple. A crowd of Marines
gathered along the strip to watch a
Corsair get off in a gusty, stormy cross
wind with a 3,000-pound bomb-load.
He climbed steadily and waiting his
turn at the target, a radio station on the
island, "maneuvered into position,
rolled over at 8,000 feet and dove on
the radio station at an angle of about 60
degrees."

He released his bombs at about 1,600
feet. He was still "grayed out" when
the bomb exploded but a moment later
he took a look at the damage. It had
been almost a direct hit.

On the following day, September 13,
1944, with a nine-knot cross wind he
did take off carrying one 2,000-pound
bomb and two 1,000-pound bombs—
probably the heaviest bomb-load ever
carried up to that time by a single-
engine fighter. This time he asked a
little more of the Pratt & Whitney
R-2800 engine. Setting his course with
the squadron for Wotje Atoll he climbed
at full military power to 11,500 feet to
get above a cloud layer. There were
high thunderheads along the route. One
of the two squadrons on this expedition
turned back because of storms. Lind-
bergh and his element, however, were
ahead of them and found the target
clear.

His objective was a small concrete
blockhouse and he started his dive at
8,000 feet. He was pointed downward
at 65 degrees, the steepest angle he had
ever used with a heavy bomb-load—
the heaviest bomb-load such a plane
had ever carried.

He trimmed the plane quickly as the
ground approached. The two 1,000-
pound bombs were controlled by man-
ual releases, and as he gripped them
he discovered that he was tail heavy.
So great were the forces set up by the
load and screaming power dive that he
no longer had strength enough in his
right hand to hold the sight on the
target. The big 2,000-pound bomb was
controlled electrically from a button
on the stick and he wanted to let go
the whole load at once.

"With a lighter load," he recalled
afterwards, "I could have pulled out
and made another dive but it seemed
inadvisable with 4,000 pounds of bombs."

However, he was not too downcast.
The whole area was thickly dotted with
Jap installations and the shore full of
Jap activity. There was just time be-
fore he reached the shore line. He
tripped the releases and pulled up
sharply. When the period of "grayout"
was over and he could see clearly again,
he looked down and discovered a black
column of debris and smoke rising above
the main naval gun installation in that

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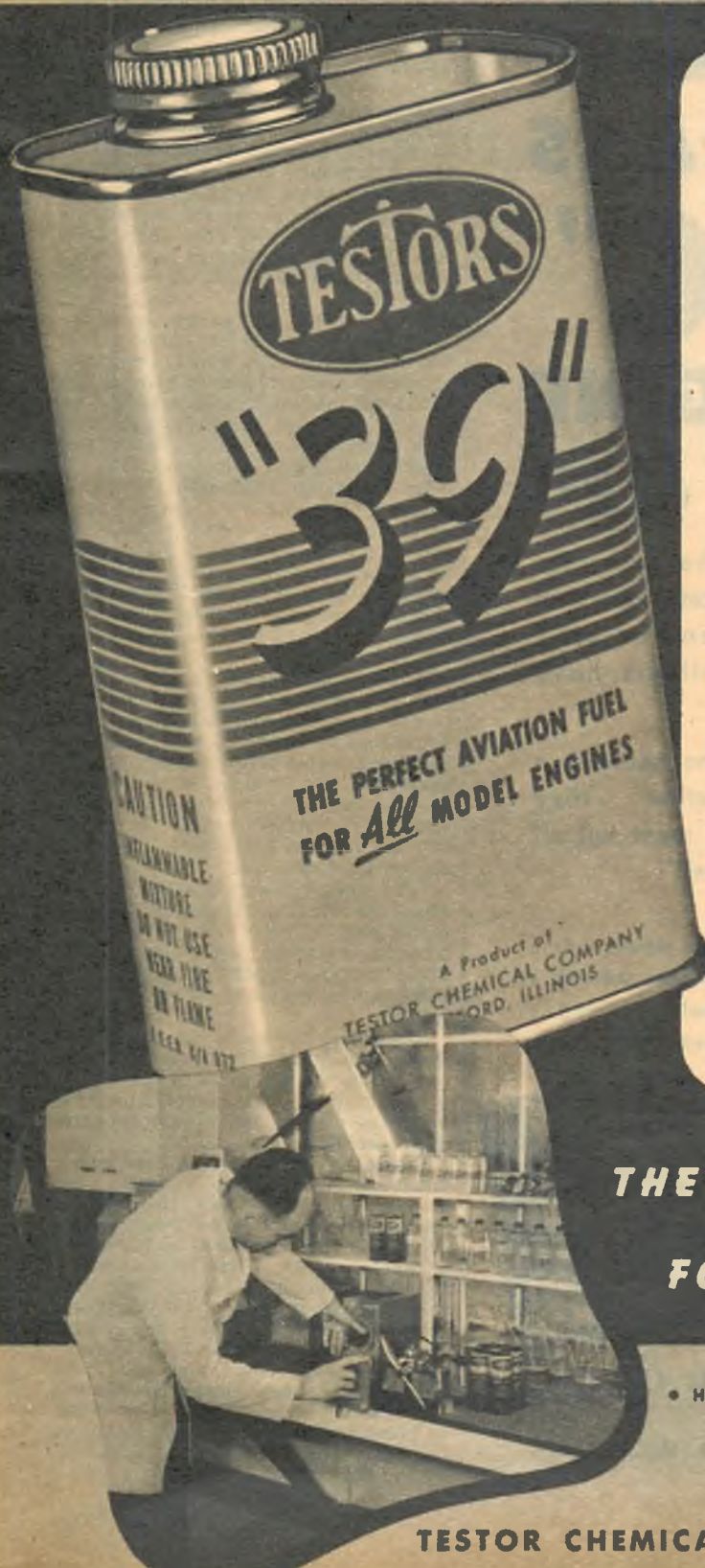
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area. The bombs had wiped out one portion of the gun position and probably dislocated the gun itself.

The thunderheads continued to pile up on the route home to Roi Island, but at 11,000 feet Lindbergh and the photographic Corsair flying formation with him wound and twisted their way between the columns of black clouds, finding narrow tunnels of light and then turning to find another "like threading a needle at times," Lindbergh later reported, and finally landing at Roi two hours and twenty minutes after their take-off.

This particular drop of 4,000 pounds of bombs completed the test program he had laid out at Roi and so that afternoon he flew on to Kwajalein Island.

There had been other missions in Corsairs for Lindbergh and there were more to come: barges and steamers to strafe, trucks and runways to strike, dives within feet of the ground and reports to write back to Vought for the engineers to study. Lindbergh also was interested in finding out how other types of fighters functioned and so he obtained clearance to do some observing with the Army Air Forces in New Guinea. There he got acquainted with the Lockheed P-38 and again soon found himself accepted as just another technical representative who also was a top pilot.

With the Air Forces, he found another way to be useful. After one of his first missions in New Guinea, mechanics checking planes discovered that Lindbergh had more fuel left than the pilot of any other ship in the squadron. This happened regularly. When this information sifted up through to the high command, Lindbergh moved, at General MacArthur's request, from group to group instructing in fuel conservation and illustrating his lectures by flying with the squadrons. His work was credited with lengthening the range and tremendously increasing the usefulness of the P-38 for long-range bombing escorts.

It was while flying as an observer with a group of fighters who were escorting a bombing mission to Amboina that he had what may have been his closest brush with the enemy. The squadron with which he was flying jumped some Jap fighters and closed with them. After eluding the attack of other P-38s, a Sonia-type Jap fighter started for Lindbergh.

"The enemy plane banked right to attack me head on," Lindbergh's laconic report said. "I fired a burst of several seconds, observing numerous hits. The Sonia then flew under me, almost colliding, rolled over and crashed into the water."

Altogether he spent six months in the Pacific, made fifty combat missions, put in 178 combat hours, and returned to Connecticut with complete reports on fighter planes, their performance and their problems.

Following the German surrender, Lindbergh, under Navy auspices, went to Germany and spent two months studying German aviation developments. When he returned home he hoped for a quieter life, but two years ago he was asked to be a special consultant to the Chief of Staff of the Air Force and today he is still active as a civilian adviser to General Hoyt C. Vandenberg. He has visited and still visits Air Force units and installations throughout the world and is as much at home in the modern jet fighters as he was in the Corsairs and Lightnings during the war.

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Scientific's "Little Devil" is as beautiful in appearance as in performance. For loops, banks, steep climbs, dives, "heights" . . . you'll find this model a top-notch performer.

SPAN	18 in.
LENGTH	12 in.
AREA	62 sq. in.
WEIGHT	4 oz.
ENG. DISP.	.02 to .09

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XPW-8

(Continued from page 52)

designs which had the cooling radiators under the nose instead of being built into the top wing. These aircraft were designated PW-8 and became the standard Army pursuit plane until the Curtiss Hawks were evolved.

Lt. Russell L. Maughan (the Pulitzer Trophy Race winner in 1922 at Detroit) flew 2,670 miles from Mitchel Field, Long Island, to Crissy Field, San Francisco in his XPW-8. This flight took 21 hrs., 48 mins., 30 sec. and attracted world wide attention because he had spanned the American continent from dawn to dusk, on June 24, 1924, thus setting a transcontinental record. As a matter of fact, Lt. Maughan is known as the "dawn to dusk flyer" because of this flight.

Armament of the XPW-8 consisted of one .50 caliber machine gun and one .30 caliber machine gun both firing through the propeller arc. The maximum speed of this design was 168 mph.

With 285 square inches of wing area, our XPW-8 model performed stunts beautifully, and a sport airfoil has been included on the plan for those modelers who do not wish to stunt. We used a K & B Glo-Torp .29 engine. However, any engine from .19 to .49 can be used although the .49 installation is recommended for the experienced builder only.

Begin construction by cutting the fuselage sides from 3/16" medium balsa sheet. Make certain you cut out for the lower wing and stabilizer. Join the rear of the fuselage sides and cement the 3/16" cross braces in place at station E. Add the remaining cross braces and plywood bulkhead B. While this is drying, the wire landing gear can be bent to shape and joined together. This assembly is then wrapped to the plywood platform with crinoline and cemented well. The plywood platform can now be securely cemented to the fuselage sides.

Cut the tail surfaces from 1/4" sheet balsa and sand to a streamline cross section. Attach the control horn in place and hinge the elevator to the stabilizer. Cement the stabilizer to the fuselage. Mount the dural bellcrank to the 3/8" x 1/2" pine block and attach the .025" music wire lead-out lines. Glue the bellcrank assembly to the fuselage and install the control rod. The engine is now bolted to the plywood bulkhead. Although we used a radial mounting, a beam mount can be installed as the plans show. On the radial mount we suggest soldering the nuts to a sheet of tin or brass and bolting it to the rear of the bulkhead in order to prevent the nuts from dropping off inside the fuselage where they are not accessible.

Install the fuel tank, either stunt or sport. Cement the nose former A in place. Apply the 3/16" sheet bottom covering as well as the turtledeck and nose blocks. Select soft balsa blocks and use very little cement on them, because they must be removed later. Carve the blocks to shape when the cement has dried and sand smooth. Do not neglect to cut away for the engine cylinder and exhaust. Carefully cut off the blocks and hollow as shown. Remove the engine and cement the blocks securely back on the fuselage. Bend the tail skid and cement to the fuselage bottom. Add the headrest and fin. Sand the fuselage and clear dope twice, sand again lightly.

The wings are the picture of sim-

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plicity, no taper, dihedral or sweepback. Both are made in one panel from tip to tip. We suggest notching the leading and trailing edge for greater strength. First cut the ribs to shape and sand smooth, then notch the leading and trailing edges. Make these notches about 3/32" wide so the 1/8" ribs fit snugly. Insert the ribs into these notches and apply plenty of cement. Cement the soft balsa tips in place. When the structure is thoroughly dry, using a sharp knife or razor blade, cut the leading and trailing edge and wingtip to shape. Sand well. Both wings can be covered with either heavy Silkspan or 1/32" sheet balsa. In view of the fact that the full-scale plane had plywood-covered wings, the sheet balsa provides an exact scale appearance. We used heavy Silkspan on the prototype model with good results. Dope the Silkspan or Sky Sail with three coats of clear. Cement the lower wing to the fuselage.

Cut the pine struts to shape and sand smooth. Four sets of interplane struts are required (these are all the same length) and two sets of cabane struts must also be made. Clear dope, sandpaper and apply wood filler to the struts. Sand again.

Wood-fill the fuselage and empenage twice with intermittent sandings. Paint the entire plane before final assembly. The color should be aluminum throughout. Several coats of thin dope bring better results than a few thick coats. Sanding lightly between coats with finishing paper, we applied eight coats of aluminum dope. Rub down with rubbing compound.

Cement the struts to the lower wing and fuselage and be sure they are pushed into the balsa about 3/16" for added strength. The soft balsa radiator expansion tanks and filling caps are now painted and cemented to the top of the upper wing. The flush brass radiators on both sides of the top wing can be painted in place or, as we did, use sheets of gold Trim-Film. The upper wing can now be cemented in place. Add the celluloid windshield and black colored exhaust stack of dowel. The rudder stripes, star insignie and all lettering are made from Trim-Film. Add the stabilizer struts and 1/16" dowel aileron pushrod. All rigging is made from heavy grey carpet or button thread. A "Froom" aluminum spinner fits the model perfectly, but a balsa or plastic spinner of the correct shape will do. Slide the wheels on their axles and solder a washer to the axle to hold the wheels in place. Bend the control line guide from .032" music wire and attach securely to the interplane struts close to the wingtip.

A thin coat of transparent fuel proofer should be brushed on the entire model, including the cowl interior, to protect the finish from any "hot" fuels you may use. We found Comet Hot Fuel Proofer covers the model with a transparent, durable coating. A removable hatch should be cut in order to obtain access to the engine.

The model XPW-8 should balance at the point indicated on the plans. Strips of solder or lead shot can be firmly attached to the nose or tail to remedy any nose or tail heavy condition that may develop. Flight lines should be at least .012" thick and can vary from 35 to 60 feet. Long lines are suggested for performing stunts. Although it is not an absolute necessity, we do all our flying with a Jim Walker "U-Reely" control handle-reel combination. With this device the flight lines can be

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.099 "OK" CUB

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.19 "OK" BANTAM

Champion of champions—holder of more records than any other engine. Has disc rotary valve! Highest weight-power ratio. Weighs only 3 1/4 oz.

Complete with glow plug, less tank

7⁹⁵



.29 "OK" MOHAWK CHIEF

Superbly engineered—features high grade metals and alloys. Block tested with full 60-day guarantee.

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varied in length even while the model is flying. Fly from smooth surfaces like wood or concrete; however, in view of the comparatively large unobstructed wheels, close-cut grass should not hinder landings and take-offs.

Bill of Materials

Fuselage. 2 pcs 3/16" x 3" x 24" medium balsa, fuselage sides and bottom. 1 pc 3/4" x 3" x 24" soft balsa, fuselage top and nose blocks. 1 pc 3/32" music wire, 20" long, landing gear. 1 pc 1/16" music wire, 24" long, control rod & landing gear & tail wheel strut. 1 pc 1/8" plywood, 2" x 3". bulkhead. 1 pc 3/8" dowel, 28" long, exhaust stack. 1 pc 3/16" x 3/16" x 10" medium balsa, cross braces. 1 pc 2 1/2" x 1/16" x 1" dural, bell crank. 1 pc 3/8" x 1/2" x 2 1/4" hardwood, bellcrank mount.

Wings. 1 pc 3/4" x 1/2" x 31" medium balsa, lower wing leading edge. 1 pc 1" x 3/8" x 31" medium balsa, upper wing edge. 1 pc 3/4" x 1/4" x 31" medium balsa, lower wing trailing edge. 1 pc 1" x 5/16" x 31" medium balsa, upper wing trailing edge. 1 pc 1/8" x 2" x 24" hard balsa, ribs. 1 pc 3/4" x 12" x 2" soft balsa, wing tips. 1 pc 24" x 38" sheet of gas model Silkspan, wing covering. 2 pcs 3/8" x 1/8" x 30" pine or spruce, interplane struts. 1 pc 5/16" x 1/8" x 14" pine or spruce, cabane struts. 1 pc 2" x 3/16" x 12" medium balsa, compression ribs.

Empennage. 1 pc 1/4" x 2" x 28" soft balsa, tail surfaces. 6 pcs 1/2" x 1" crinoline, hinges. 1 pc 1/4" x 1/4" x 10" pine or spruce elevator spar.

Miscellaneous. "Froom" spinner, 2 3/8" wheels, washers, nuts and bolts, cement, clear dope, thinner, aluminum dope, hot fuel proofer (transparent), "Trim-Film," heavy thread, celluloid.

150 mph—Plus!

(Continued from page 44)

my Class B airplane in size—simple, eh?

Knowing that this model had been successful with a B Class engine, I "stole" the entire design and used it as a whole. With the design out of the way it became a mechanical problem: how to get a .60 engine into an airplane designed for a .30. There being two hot racing engines available, Dooling 61 and McCoy 60, I did not have much choice as to the power plant. The Dooling weighs about 16 oz. bare and the McCoy goes about 14 oz. It was determined that the McCoy could be cut down to about 1 1/2" across the crankcase, whereas the Dooling would have to be about 1 5/8". Realizing the engine would have to go into a Class B airplane, I had no choice but the McCoy, since the lighter weight and narrower cross section were imperative.

Now that I knew the engine I was to use as well as the size, it was not too hard to visualize the plan form as that of a "Speedwagon". However, with the higher wing loading it seemed necessary to obtain more lift than that available from my old airfoil. Therefore I used the same shape but raised the thickness from 8% of the chord to 10%; tests showed that this was just about right as the model was not too fast on the landing.

I did break away from the original layout in the cowl design. During discussions with local aeronautical engineers the point was brought up that there had been some marked improvements in duct design during the past few years. Bob Wood of the Bell Aircraft Company's staff came up with the very latest. I was quick to grab his suggestions and incorporate them into my design.

The general idea is called the "steam jet principle," with quite a few factors taken into consideration. The main

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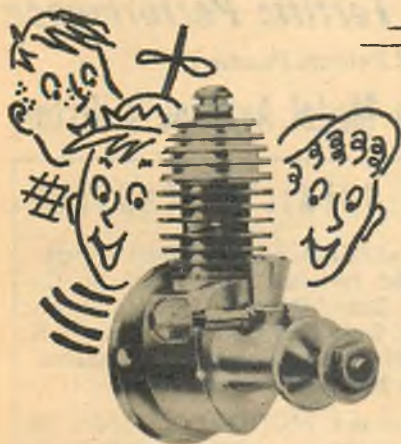
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idea is that the air is rammed into the cowl, heated by the engine and expelled out the rear at a higher velocity. When properly applied the thrust developed is supposed to more than offset the actual drag of the cylinder itself. Certain angles and dimensions must be held to close tolerances. The main sketch gives you the general arrangement as well as the points of close tolerances. In practice the set-up proved its worth, resulting in a cool running engine; you could actually feel the push provided as the hot air was exhausted out the rear duct!

One of the major problems was to get the large engine into a fuselage only two inches wide. This was done by cutting the lugs off so that they were only 2" in width. This point was just inside of the motor mount bolt holes; therefore it then became necessary to drill new holes. In doing so I matched them up with a McCoy 49 engine so that as far as the mounting holes were concerned they were interchangeable. Then I had to narrow the crankcase below the lugs so there would be sufficient room for motor mounts. When finished, it was seen that the mounts could only be 1/4" wide where they went by the engine; this would not provide enough strength without some reinforcement done with a steel plate that fits under the maple crutch and also provides a nut plate for the engine bolts.

The crutch itself was run the full length of the airplane and was 3/8" in thickness. It was hollowed out in the center to accommodate the fuel tank and lighten it as much as possible. When the usual balsa was applied to the crutch, faired off nicely and covered

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with gauze, the result was an almost indestructible bottom, light in weight. The rest of the model was of normal balsa construction and covered with gauze for strength. The entire airframe minus the engine and tank weighed in at only 6 ounces!

One of the major problems that has stymied the speed flyers during the past few years has been a reliable fuel system. As our speeds have gone up the problem has become more and more acute due to additional centrifugal forces and acceleration.

I was aware that there was a system providing constant pressure under all conditions that had been used in the past with fair result. Its latest application had been by Don Newberger who used it with his Atwood engine in winning the Class C event at the 1948 National meet.

I had talked to Bill Atwood and from what he said the system seemed a good thing providing you worked out all the wrinkles. My first chance came at the Plymouth meet where I applied it to a stubborn "49" job, and the result was my first really successful flight from that airplane! So when it came to my new ship I planned on using it from the beginning and laid my design out to accommodate it.

A pressure fuel system is very simple in theory as well as operation when the basic facts are known. The idea is to tap the pressure generated in the engine's crankcase and feed it to a sealed fuel tank, thus forcing the fuel from the tank to the engine. Inasmuch as the fuel tank is full when you start the engine, it takes just a small volume to bring the pressure in the

tank up to that in the crankcase. After this the pressure is replaced only as the engine uses up the fuel, and consequently you suffer no reduction in the performance of the engine. With this system it then becomes possible to adjust your engine to its peak on the ground and to know it will hold this peak throughout the flight. Your last lap will be equally as good as your first or any other during the flight!

The pressure outlet on the engine was installed directly into its rear cover, using the rotary valve to time the opening and closing. This was so too much pressure would not be generated and the pressure in the fuel tank during the period of negative pressure in the crankcase would hold up. The ideal timing seemed to be to have the pressure jet open just as the rotary valve closed the engine's intake venturi. This allows a gradual build-up to peak and then a sharp cut-off. My pressure jet consisted of a 4-40 flat head (counter-sunk) machine screw installed through the rear cover with the head on the inside and a nut on the outside to hold it in place. A #60 hole was then drilled through the screw to act as the jet opening.

The fuel tank itself was made following the instructions that came with the engine. Its size was determined by the space available in the fuselage, which made it quite small. However, with pressure you can expect about twice as many laps with a given amount of fuel, so there should be no worry about the size of the tank.

Construction is the major problem as there cannot be the slightest leak at any time or at any place in the entire

system. The tank should be made from about .012 tin stock with every joint lapped over and soldered well. It should be tested under water with about 5 lbs. of pressure to be sure there are no leaks. The outlet to the needle valve is located one-third of the way from the rear and one-fourth of the way up the tank from its lower edge.

Two vent tubes are required, one to be used as a breather while filling the tank and the other to be the pressure inlet. The breather tube should be located at the highest point of the tank while sitting in a normal position; it should be flush with the inside and have a means by which it can be stopped up. The pressure inlet should be at the forward end of the tank and at the very top also. The inside end of the tube should be flush against the side of the tank which faces the in-board side of the model while in flight. If it should point into the fuel it will cause a boiling action which results in a false adjustment.

A good neat job on the fuel tank removes a great many bugs from this system. The tank is installed in the airframe very securely so there is no chance for it to shift in flight. It is hooked up to the engine with a good grade of Neoprene tubing; a poor grade may burst under pressure. Wherever the Neoprene is slipped over the tubing it should be clamped in place with soft wire in order that it cannot possibly leak.

In the second part we'll get into the operation of your engine. It's a lot easier than you might think.

(To be concluded)

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Spirit of St. Louis

(Continued from page 46)

frame as indicated by the heavy lines. Construct the sides of 3/32" sq. very hard balsa, over a sheet of wax paper to protect the plans. To guarantee identical sides, build one atop the other. Join with the three forward pairs of crosspieces and pull together at the rear when dry. Square up the frame and fit the remaining crosspieces. Mark the positions of the 1/16" sq. very hard balsa stringers and cement to the top and sides. For the control line model cut the bellcrank mounting plate from 1/16" plywood. Insert the bellcrank pivot screw and lock with a nut. Cement the assembly in place, blocking it into the structure with strips of 3/32" sq. balsa. For rubber power, cement 1/8" balsa plates at the rear of the fuselage and drill for a 3/16" dowel rubber mounting peg.

Build up the nose block of 5/16" soft balsa. Note the engine is to be mounted horizontally for control line and upright for free flight. Block the appropriate firewall in the nose with 3/32" sq. balsa, using several coats of cement for a secure job. Make a section of the side removable for the O.K. installation, or of the top for the K&B installation. Tack back in place with drops of cement before shaping the nose. True up the rear face of the block and cement to the fuselage. Shape from a perfect circle at the nose to blend into the fuselage frame. Use a knife or miniature plane for roughing, and finish with successively finer grades of sandpaper.



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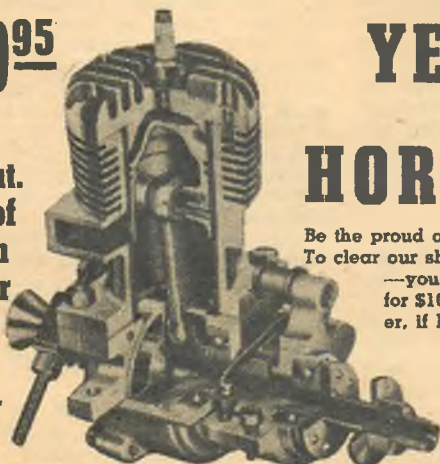
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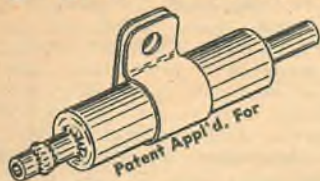
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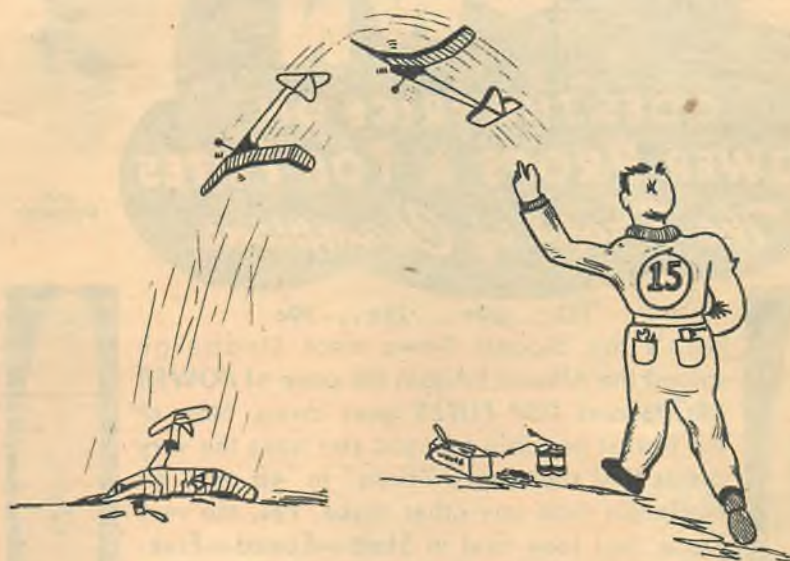
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Form the landing gear struts of piano wire over the true length patterns. To clear the large rubber-powered propeller, the extended gear should be installed. Sandwich the front strut between two formers F-1 of 1/16" hard balsa, notching the longerons slightly to bring the wire out at the bottom corner of the fuselage. Bind the rear strut to the bottom crosspiece with thread and cement. Install the side gusset F-2 of 1/8" balsa. Fit 1/8" sheet balsa to the curve of the bottom longerons as far back as the third crosspiece. Blend into the contours of the nose. Fair the landing gear struts with 1/16" balsa, sanded to a streamline section. Form the tailskid of .040 piano wire and cement in the fuselage.

Cut away the nose as required to clear the engine to be installed. Bolt the motor to the firewall with 2-56 machine screws. Block the tank in position and run a fuel line to the engine.

Sand the entire framework carefully to remove any bumps and cover with lightweight Silkspan or Sky Sail. Spray with water and apply a couple of coats of clear dope when dry.

Cut the tail surfaces of 1/16" sheet balsa, sand smooth and dope. Use the enlarged stabilizer outline for free flight gas or rubber power. For control line work, cement the elevators to a 1/16"x3/16" hardwood spar and hinge to the stabilizer with strips of fabric. Form the control horn of .032 alum. and cement in place.

Mount the stabilizer on the fuselage, using the wedge F-3 to obtain the correct angle of incidence. The tail chord line should be parallel to the top of the fuselage at the wing position. Cut

out three celluloid washers and dope to the covering to reinforce the openings for the lead-in wires and the pushrod. Splice .020 piano wire "lead-ins" into the bellcrank. Form one end of the .050 piano wire pushrod in a "joggle" and slip into the bellcrank. Poke the pushrod through the celluloid washer, drop the bellcrank on the pivot screw, and adjust to operate freely. Lock with an extra nut. Set the bellcrank in neutral and bend the end of the pushrod to engage the horn with the elevators also in neutral.

Cement the rudder in place, offsetting it 3/8" to the outside of the circle for control line flying. For free flight gas and rubber the rudder should be hung by soft wire strips to permit adjustment. If desired, the stabilizer may be cut at the hinge line and the elevators hung in a similar manner.

Make a tin template of the Clark Y wing section and cut 26 ribs of 1/16" sheet balsa. Shape the leading and trailing edges to the proper cross section. Extend the wing plan from the center line to permit a full span assembly in one piece. Pin the leading edge to the plan and cement the tip and center ribs to it. Push the trailing edge in place and add the remaining ribs. Remove from the plan and install a 1/8" x 5/16" hard balsa spar. Reinforce the main strut attachment points with 1/16" sheet balsa plates. Roughly shape the tips of 1/2" x 5/8" x 4 1/4" soft balsa, cement to the wing and smooth with sandpaper. Cement two short lengths of 3/16" dowel in the left wing tip and drill to mount the .040 piano wire control-line guide.

Sand the wing smooth and cover with

lightweight Silkspan or Sky Sail tissue. Spray with water and apply two coats of clear dope when dry. Check frequently while drying, twisting out any warps as they develop.

Cement the wing to the top of the fuselage, checking the alignment carefully. Shape the streamlined wing struts from the true length layouts. Pin the 'Vee' struts A to the fuselage and hang the shock strut B from them. Note the shock strut is not actually connected to the landing gear, which remains free to flex. Cement the main strut C in place and adjust so that A and C are in a straight line when viewed from the front, by varying the position of strut D. Fit the rear wing struts E and the stabilizer braces F.

Lay out the positions of the dummy cylinders on the nose and recess about 1/16". Cut eight pieces of .005 soft alum. to the approximate size of the nose cowl panels. Finish the surface with the distinctive "spotted" effect. A 3/16" dowel with a cork pad dipped in carborundum powder will work nicely when spun in a drill press. A small disk of fine wet or dry sandpaper, used wet will also do the trick. Overlap the "spots" and take care to follow a regular pattern for the best effect. Form the panels carefully over the nose, using a piece of inner tube to protect the finish while working. Trim and cement in place and cut out the cylinder positions.

Build up the cylinders with wafers of heavy black paper, about .020 thick. Each cylinder requires one each of A, B, C, & D, and seven each of E & F. Cement together in alphabetical order. Angle the bottom of each cylinder to

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set true on the nose. Add the rocker boxes G of scrap balsa, the exhausts H of 3/32" diam. alum. tubing, and the pushrods I of pins. A simpler cylinder can be made of a 7/16" diam. balsa dowel 4 1/2" long if desired. Wrap with heavy thread, dope in place and cut off short lengths. Add details as described.

Carve the rubber power propeller from a hard balsa block 7/8" x 1 1/4" x 7 3/4". Shape the blades to an airfoil section and balance carefully. Fit a plug of 5/16" sheet balsa snugly in the nose and cement to a 1/16" plywood disk. Mount bearings on both sides of the nose plug and the back of the prop. Form the forward end of the shaft, imbed in the spinner and cement. Slip a couple of washers and the nose plug on the shaft and form the rubber hook. Cut away the covering below the rubber peg and install 8 to 10 strands of 1/8" flat T-56 lubricated rubber.

The entire ship was painted aluminum. This can best be applied by spray, but may be thinned and brushed on. Lay out the lettering first in pencil outline and fill in with black India ink. The wing tank vents, airspeed pitot, controls, interior, *et cetera*, can be made of any handy bits of wire and wood clutering up the workbench. In the January 1950 Air Trails a revealing cut-away by Douglas Rolfe was published from which many details may be gleaned.

For flying on control lines the model should be balanced well forward at the point indicated. And guard against overcontrolling during the first flights.

For free flight gas or rubber the model should be balanced at the farther aft position. Glide the ship over tall grass, bending the elevators up a little at a time to correct diving, or down to overcome stalling. Adjust the rudder to obtain a straight-ahead glide. Start the motor and launch as for gliding. With the small K&B engines a gradual climb will be possible. Bend the rudder until the ship climbs in a wide right circle. When flying with rubber power, slight right and down thrust may be necessary.

The ship photographed, one of several sizes constructed over a period of years, is exactly double the size of those on Air Trails "full size" plan and described above. If it is desired to build this larger version, merely double all dimensions and material sizes. The original was flown both control line and free flight powered by a K&B 29 ignition engine. For best free flight performance, no more than three-quarter power should be used.

Bill of Materials

All material medium balsa unless otherwise specified

2 pcs 1/16 sq. x 36" hard, stringers. 5 pcs 3/32 sq. x 36" hard, fuselage frame and blocking. 1 pc 1/4 sq. x 36" leading edge. 1 pc 1/8 x 1/2 x 36" triangular trailing edge. 1 pc 1/8 x 5/16 x 36" spar. 1 pc 1/16 x 3 x 36" tail surfaces, wing ribs. 1 pc 5/16 x 3 x 18" wing struts, gussets. 1 pc 5/16 x 3 x 15" soft, nose. 1 pc 1/2 x 3/4 x 10" soft, tips. 1 pc 7/8 x 1/4 x 8" hard, rubber prop. 1 pc 1/16 x 3 x 4" plywood, firewall, bellcrank mount. 1 pc 1/16 x 3/16 x 8" pine, elevator spar.

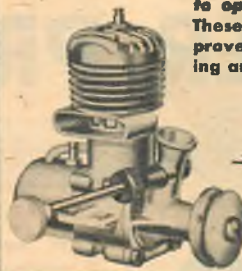
10" 1/16" piano wire, landing gear. 36" .050 piano wire, landing gear, pushrod. 10" .040 piano wire, tail skid, control line guide. 36" .020 piano wire, lead-in lines. Small bellcrank. One 4-40 mach. screw and three nuts, bellcrank pivot. .032 x 1" sq. alum., horn. .005 x 6" sq. soft alum., nose covering. 1 5/8" diam. wheels. 1 1/4" diam. spinner, lightweight Silkspar or Sky Sail, cement, clear dope, silver dope, black India ink. .020-.035 cu. in. free flight engine. .049-.074 control line engine. Small gas tank.

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Size 10-10Ea. 65c

Size 11-8Ea. 65c

**"SCAMPER PROPS
Will Not Whip or Fly
Apart in Midair."**

Mr. Pitts

(Continued from page 31)

was love at first sight with Betty, and since purchasing the ship from Bristow she has flown the gaily painted little beauty in air shows all over the United States, and took it abroad for a series of exhibitions in the British Isles.

The Little Stinker is powered with a 90 hp fuel injection Continental. The third of the Jeep series is now under construction at Gainesville, being built on order for Miss Caro Bailey, a young Miami aviatrix. This plane has the same configuration as the Stinker but is being powered with the new Lycoming 125 hp flat four engine. This will make it a first cousin to a skyrocket. One characteristic Pitts demands of all his stunt jobs is that the engine run as well inverted as it does upright. With that in mind, the Lycoming will be equipped with a diaphragm pressure type carburetor.

What was said about this outfit being composed of airplane men is reflected in a conversation with Phil Quigley regarding this new ship.

"Phil," we asked, "with that much horsepower in the Jeep, aren't you worried about how you're going to get it down when you test-hop it?"

Phil, his elfish grin a mile wide, responded: "You know, seriously, I was just thinking with that horsepower and a special ramp about fifty feet long set at an angle, and one of those new 40 pound Jato bottles on the belly, you could start an air show straight up from the middle of the airport."

Curtis Pitts is a good engineer but

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not by virtue of formal education or a college degree. He's studied assiduously and has completed correspondence courses in engineering. Pitts is a triple-threat man in his field: designer, mechanic, and pilot. His approach to a mechanical problem is straightforward, in the manner advocated by Bill Stout or Charles Kettering. Never the negative attitude of consulting the books to see why something can't be done—but "design it, try it, change it."

"All this business of constant pressure fillets!" he remarked. "I can hook some long streamers on my wings and fuselage and watch them in a mirror while I'm flying and pound out some fillets that conform to their flow pattern. Then if tufts of yarn lay flat on them when I test-fly them, I guess they're constant pressure. But I can't see designing them by formulas and beating my brains out making radius blocks."

We picked up some tips from Curtis that will be of value to anyone interested in entering the midget racing game.

First, it's not necessary to be an expert engineer to develop a midget racer. There should be, however, an experienced A & E mechanic in on the project, who has a wide knowledge of sound structure. Many advanced model airplane designers have the ability to design a good midget racer, though they should be ready to plow through the many NACA bulletins on aerodynamics that will be of tremendous help. (Steve Wittman says that all the "secrets" of the business are in those bulletins, and all you have to do is read them.)

A set of drawings should be made showing the three-views and in addition a bottom view with the structure

worked out and the structural ties shown. This set of drawings is sent to NAA, which hands them over to an experienced aeronautical engineer who studies them and makes suggestions, both aerodynamic and structural, should they be needed. A free consulting engineering service is what it amounts to and, Curtis says, it's a good one.

"I spot the pilot, tanks, engine, and so on in their correct relative positions on the drawing first," Pitts explained, "and then locate the aerodynamic force positions in the correct places and work out the three-view to fit them."

Curtis recommends a tail moment arm of about two and one half times the chord as being generally satisfactory. From the trailing edge of the wing draw a line slanted up about 30° to the longitudinal axis and try to keep the flippers and rudder below this line. This is on the theory that during a stall everything above this line will be in extremely turbulent air.

Pitts' airplanes are carried from the design stage through construction with painstaking attention to detail. From basic welds to the wax finish on the dope, the workmanship is of highest caliber. A requirement of the midget racers is that they be designed for a load factor of at least 7 G's. Curtis is more comfortable flying his midget racer knowing it was designed for 9 G's. This care in construction, of course, removes any possible difficulty with the CAA in securing an experimental ticket on the ship.

To get the most from a racer during competition, it must have no bad flight characteristics. For example—high-

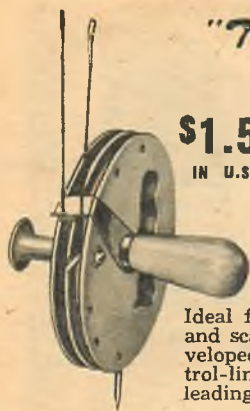
speed tip stalling can be disastrous when you pull into tight pylon turns. If a ship has unhealthy tricks like that a pilot can't take advantage of optimum performance. He has to be very careful to keep a light hand on the stick and leave plenty of leeway.

The new Special which flew at Miami in the Continental Trophy race is the second of Pitts' racing planes. The first was a low-wing job with a plywood wing (the new one uses all-metal wing the better to resist the semi-tropical climate) and more pronounced taper. Bud Heisel crashed in it during the same California racing meet in which Art Chester was also killed. That crash was not the fault of the ship, but Quigley told us the flying characteristics of the new racer are so superior to those of either the first one or of any other racer he's flown that there's practically no comparison.

"This one flies like a lightplane," he said. "No tip stalling, plenty of warning for a normal stall, and instant recovery when you relax back pressure. You can fly your best race in this one and forget about the plane. It's also a dream on cross country. Relaxing and easy to fly."

Pitts believes in using the racer on cross country and it will go to the meets under its own power. Two wing tanks, not filled while racing, bring the total gas capacity to 19 gallons. This yields over three and one half hours of cruise at 170 mph airspeed.

"Some of the boys don't fly their ships much except during the races," Pitts observed, "but I can't see that. I want my ships in the air. I fly a racer and my pilot flies it until we're so cramped from sitting in it we can't unbend—but



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(AT-6-50)

when a race comes along we know what the ship can do."

The boys are busy now getting the little sleekster ready for Cleveland—assuming some outfit will pick up where Goodyear left off and sponsor a race for the midgets. A new engine—the rebuilt one now installed is a mite weak—some more prop research, a few other modifications and there will be a sporting chance that Phil Quigley may have one of his fondest hopes realized: looking back at a front view of Wittman's ship when the finish line slips underneath. Ahead of the rest of the field, of course.

"You know," Curtis told us, looking up from the task occupying him and with a big grin on his face, "there's not much money in this racing game. It's just a hobby; a lot of fun messin' with the little devils. But it's the best excuse I know to goof off from working and go scooting off to the air shows."

Solo Club

(Continued from page 34)

ride with him to determine the trouble. "Sure enough, the airplane started to spin on the final turn—but there was a reason. He was holding full left rudder to turn into line with the runway, and full top aileron to keep the airplane from banking as steeply as its inherent stability demanded."

Do you recall all the mumbo-jumbo about down-wind turns a few years ago? These, 'twas said, were the killer. Actually, it was the same old story of crossed controls brought about by the evidence of drifting, evidence that was perhaps misinterpreted since it appeared to affect the speed of the plane relative to the ground. When power is being carried—many of these accidents occur at cruising throttle—the stall from the slowed-down, crossed-control turn will wind up in a spin that usually defies detec-

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tion and, since the plane is low, as when looking over the old homestead, recovery is almost never possible.

In the past when people like Stinson, Ercoupe, et al tried to take the bite out of the airplane they were foolishly penalized by the spin requirement which made spinable planes preferred on the flight line. Operators of special equipment simply watched the business go next door. With the spin requirement out of the way, the manufacturers can get on with the business of making planes less liable to break your neck when you unwittingly persist in crossing controls and trying to make a plane turn tighter than it normally tends to.

The CAA "old guard" probably never considered this, but no one will ever know how many good customers, potential airplane owners, were scared away from learning to fly when they encountered the spin. Now we rugged girls and boys who took our spin tests may find it hard in retrospect to realize that spin experience could be frightening to the average citizen who did not share our enthusiasm and understanding of aircraft. But consider that, having sold a businessman on getting his feet off the ground, we stuck him in a noisy Cub and spun him about in a manner terrifying to all normal instincts. Silly? Not at all. The writer recalls two doctors in a southwestern city confiding that their experience with spins made them wonder what they were doing there, and so they gave up flying. People who later gained confidence with understanding were at first alarmed by a steep turn!

Solo Club member Lloyd VeVea, manager of Lloyd's Mobile Service, Thief River Falls, Minn., bears us out. Lloyd is 38 years old, belongs to CAP, and was a private pilot with 200 hours when we first heard from him.

"With 200 hours," says Lloyd, "I do not feel at home going into a strange large port. Now I am not a coward but I still will not spin unless I have to, yet we got hours of instruction on spins, and only one cross country trip. This should have been changed long ago to give a pilot more cross country know-how." With that we agree. And we stick by Lloyd on that spin statement. We won't either unless we have to! A hearty "good riddance" to spins.

"At present I am stationed in Japan," groans Sherrill W. Derryberry, "so am unable to get any private plane time. Since I have been here for 19 months with another

ten to go, would like to hear from club members (interested in prices on used PA-11's and T-crafts). Soloed in 1947 at Jackson's Flying School, Cypress, Texas. Got my private in May of that year. Hope to buy a plane when I get home." Sherrill's address: 8th Fighter Squadron, 49th Fighter Group, APO 919, c/o Postmaster, San Francisco.

Elmer E. Thomas, Solo Clubber #8639, soloed in 1940 at Hamilton, Ohio, then, after time out for the war, got his private in Middletown, Ohio, (we've been in and out of that field many times, Elmer!). But now he does all his flying in Mariners as a mechanic and flight engineer.

"Been flying in PBM-5's here at Bermuda for the past two years and have grown very fond of these old box cars," Elmer tells us. "I feel more at home with my feet on the panel than on a nice soft footstool at home. Have some good 8-mm movies of Bermuda from the air and if anyone would like to get them, would make more for the price of the film or for the duplicates. Will do this for Solo Clubbers and no one else." Mighty nice of you, Elmer. Elmer Thomas can be reached at: AD-2, VP-45, Navy 138, c/o FPO, New York, N. Y.

Most of us are dubs who never will afford what it takes for a fat log book. But among us are people with all kinds of time and flying experience. Just to make you drool we'll ask one of our more experienced members to say a few words about himself. So take the soap box, J. E. Howitt, Toronto.

"I joined the RAF in 1935," Howitt begins, "on a direct entry NCO pilot trainee and soloed after seven and one-half hours on a Tiger Moth. After ten weeks (50 hours) I was posted to a Service Flying Training School for instruction on service aircraft, such as Hawker Harts, Audax, Fury Mark 1, and so on. After six months (150 hours) graduated as fully qualified pilot and was posted to No. 41 Fighter Squadron, flying Hawker Demons, in 1937. Stayed with this squadron until December 1940, then posted to Central Flying School. Had, by then, flown Fury Mark 2's and the Mark 1 Spitfire.

"During the war, flew with 41 Squadron, covered the evacuation of Dunkirk, took part in the Battle of Britain and did innumerable convoy patrols over the English East Coast and North Sea.

"After completing my instructor's course in 1941, spent three years as an elementary flying instructor in England and Canada. Finally finished my RAF career as a trans-

port pilot. Log book shows 3155 hours on Moths, Tutors, Magisters, Cornells, Spitfires, Harvards, Harts, Demons, Furies, Audax, Gauntlets, Oxfords, Wellingtons and . . . the Link Trainer."

Say, Howitt with all that experience you must have some comments of special interest to us amateurs. How about it, ever make a mistake or go through a forced landing?

"Well, during nine years of flying," says Howitt, "I damaged only one aircraft, a Fury Mark 2 which I ground-looped after landing. I had 350 hours then and knew all there was (?) about flying! When I took my instructor's course I found out how much I didn't know. Twice I put down Spitfires with burst tires, once ending up on my back. One Spitfire was shot up at 30,000 feet, but I finally landed it successfully when I found a camouflaged aerodrome directly beneath at 1,500 feet. That's enough of this line shooting . . . why don't you write more Solo Club? Always read that first. Also go for models (Diesel enthusiasts) and brought four motors with me from England."

C. A. P.

(Continued from page 35)

Arco already has an aviation education program underway in the local high school.

In California, Wing Commandant of Cadets Maj. Edmund C. Fey and Wing Adjutant Capt. Marylou Wittenberg, received the Distinguished and Exceptional Service Awards, respectively. Maj. Fey received his award for throwing himself in front of a Cadet in a crash landing and saving the Cadet's life, while Capt. Wittenberg received her award for four years' faithful service to CAP.

Col. Marvin Melton, CO of the Arkansas Wing, is helping the state to set up a statewide aviation education project in cooperation with CAP. The program will be on a four-point basis of (1) a mail survey of selected Arkansas schools to describe tentative aviation courses; (2) plans for summer workshops for teachers on aviation subjects; (3) a 30-day summer school for teachers at a USAF base; and (4) plans for an aerial caravan to take aviation equipment, exhibits and planes into cities throughout the State.

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HENRY ENGINEERING CO
BURBANK, CALIFORNIA

Forster 29

(Continued from page 56)

rings for the steel fully lapped piston used on previous models, much of the piston drag or friction has been eliminated. During test runs it was noted that there was very little engine vibration even at reduced rpm, which may well be attributable to the lighter piston. To prevent scoring of vital parts, retaining rings are used on both ends of the wrist pin and also on the crankshaft where it eliminates excessive end play.

This crankshaft retaining ring should prove invaluable to those flyers who use electric or inertia starters and inadvertently apply too much pressure against the spinner. An excessive amount of pressure can force the crankshaft rearward against the rotary disk in some engines, which then scores this vital part. The Forster crankshaft remains mounted on a single 7/8" o.d. Fafnir ball bearing, but still bears against a bronze bushing with which the front crankcase cover is lined.

In place of the timer housing, the G-29 features an extra-long turned aluminum friction-drive propeller washer. Because of its length, it may be considered an extension shaft since it places the rear face of the propeller well forward of the cylinder barrel. This is an ideal condition to have when considering engine cowling. The special propeller nut which threads onto the crankshaft and into the drive washer makes it necessary to drill out the hole in the propeller to 5/16" diameter, but offers the advantage of adding a spinner without trouble.

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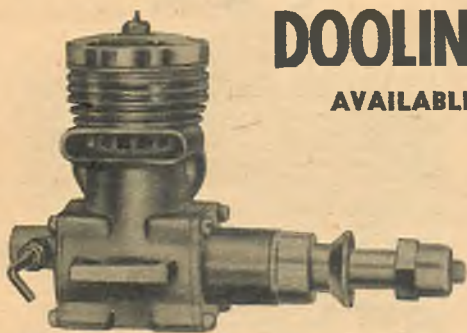
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The engine is very clean both on the outside and internally. Two "raising blocks" are supplied with each engine, these for use when model plane plans call for the engine to be mounted on the exact centerline of the crankshaft.

Along with the engine the manufacturer includes a venturi tube which fits inside the air-intake tube. For sport flying and easy starting, the installation of the venturi tube offers an advantage. This is equally true when breaking in the engine, at which time easy starting is important. After the breaking-in period, when the owner wants topmost performance with perhaps small racing propellers such as 7/9, the venturi tube can be removed. For all-round good performance, however, Forster suggests the venturi tube be kept installed.

Crankcase: one-piece cast aluminum alloy with exhaust stack cast integral. Crankcase cover: cast aluminum alloy, bronze bushing. Held to crankcase with three machine screws. Cylinder liner and fins: machined from steel for an easy slide fit with five square exhaust ports and four intake ports. Held down with four machine screws. Cylinder head: cast aluminum alloy. Held to the steel liner with six machine screws. Crankshaft: steel, ground to a smooth finish and mounted on a $\frac{7}{8}$ " o.d. Fafnir ball bearing. One retaining ring. Connecting rod: cast aluminum alloy with bronze bushing at the crankpin end. Wrist pin: hollow steel, full floating. Two retaining rings. Piston: cast aluminum alloy with two cast iron piston rings. Rotary disk: steel, ground and polished. Mounted on a steel pin and driven by the crankpin. Venturi: machined aluminum threaded to rear of crankcase and held in position by

a lock nut. Needle valve body: one-piece brass. Needle valve: steel, long tapered to sharp point. Knurled aluminum finger grip held in positive adjustment by double-sided spring steel clip. Factory-recommended propellers: 9/6 for free flight and sport flying, 7/9 for speed flying. Special features: beam mounted with extra blocks supplied for mounting on the crankshaft center line. Mounting bolts are also supplied.

The following rpm's with various propellers and fuels were recorded on engine "out of the box": Top Flite 10/4, Testor's 39—11,000. Power Prop 9/6, O&R #4 and Testor's 39—11,000. Rev-Up 8/9, O&R #4 and Testor's 39—10,000. Tornado 7/9, O&R #4 and Testor's 39—11,000.

Vol à Voile

(Continued from page 25)

laughed. Of course, I could glide at Beynes as much as I liked. M. le Directeur was mistaken. Too far from the actual scene of things. That was his trouble.

Then, I was introduced to Monsieur Raymond who was to be my moniteur. M. Raymond was learning to speak English so that he could instruct the many Scandinavians who came to Beynes for *vol à voile*. He was a stocky fellow with a happy disposition and a mouthful of French dentistry. If you can picture a large elf with a mouthful of lead bullets, that was M. Raymond.

It was arranged for M. Raymond to take me for my baptismal ride. I was helped into the mysterious buckles and

trappings of a French parachute and strapped by his side in a sleek, dual-controlled sailplane. "We will speak only English," he said.

Someone hooked a cable to the nose, a signal was given and the machine began to move. We were being reeled in by a winch located far ahead upwind, hidden by a rise in the land. Without a sound, we were swept off the ground and were soon climbing at an angle which would have been dangerous in a powered plane. I stiffened, expecting the plane to stall. "Nothing bad," chortled M. Raymond slapping my knee. "Everything is good."

As we passed over the winch the hook released, freeing us to float quietly above the green fields at an altitude of two hundred meters. In the Navy SBD I used to fly, being at this altitude without an engine would have meant a short, steep glide to the ground. But this plywood bird cut smoothly through the sky, losing very little height and making no sound but the faint whistling of its airstream. We were able to circle the field three times before landing.

M. Raymond turned the controls over to me and we talked in a mixture of French and "English." He was very curious about life in America and so overwhelmed when I told him that my government was paying me to study in France, that I had to remind him to show me how to land. We settled down, rolled along on the belly wheel for a short distance, and stopped.

The crowd surrounded us. *Ca va?* How did I like it? I told them I loved it. What kind of planes had I flown in America? Had I ever been in Holly-

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wood? I answered as well as I could. One of them asked M. Raymond something which made him laugh. Later, he told me that they wanted to know if I spoke English all right.

I realized that besides having a wonderful time at *vol à voile*, I would also meet the kind of Frenchman who would never think of going to the Americanized cafés in St. Germain des Prés and Montparnasse. I went into the office with Guy and M. Lépense. They arranged for me to take a physical examination and get an insurance policy; necessary formalities.

While we waited for a special bus to take us back to Paris, Guy led me to a place in the field where a plaque was imbedded in the earth. "It is a memorandum and also a grave," he said. "An instructor and a mechanic made a test flight. But the mechanic assembled the controls wrong. They worked backwards. So they were killed. Heroes." He bowed his head.

Heroes they might have been in French eyes, but it worried me a little. I had never heard of an American mechanic making such a mistake. Nor had I ever known a pilot who would take off without checking the motion of the control surfaces. Well, I'd watch out for such things.

I bought the insurance policy at the Fédération Nationale Aéronautique. It cost little and, if you were injured, paid little. The doctor they'd sent me to was an overworked general practitioner on Avenue Victor Hugo. He gave me a five-minute physical examination, tapping me here and there; never bothering about the eyes at all which, in America, are the most important point. He filled out a form asking me some questions. When he reached the question about my age, I had my usual trouble with numbers and told him I was ninety-two instead of twenty-nine. After clearing up that matter, he collected two hundred francs, gave me a paper and bade me *bonne chance*.

For the next three days, it rained. The fourth day was fine. I bolted my Sorbonne lecture at noon, caught a cab to the Invalides and was waiting for the Simca at one. When it came, the crowd inside greeted me uproariously. They sang all the way to the field.

At the field, M. Raymond met the bus and put me to work. This time, I learned that in order to soar for five minutes, one had to push planes around for hours; pushing them into and out of hangars, pushing them into position for the hook—pushing, dragging, pulling.

After pushing for half the afternoon, my turn to fly arrived. M. Raymond wanted to be sure of a long flight and decided to have us towed aloft by a conventional plane. Flying an old German Storch monoplane, M. Lépense pulled us to an altitude of fifteen hundred meters and we cut loose.

On this flight, I learned a lot about powerless flying. You always kept your nose a bit down. Even when you were being lifted by a rapidly rising air current, the nose was down. When you landed, you had to do it right because you could only do it once. You were able to feel the air bubbling over hot earth and underneath clouds. You were a seagull; a turkey buzzard. You were part of nature.

In the next few days, I made five flights with M. Raymond; three launched by the winch, and two towed by the Storch. I was anxious to try it alone. "I am ready now to fly *tout seul*," I told Raymond. "Mais non," he



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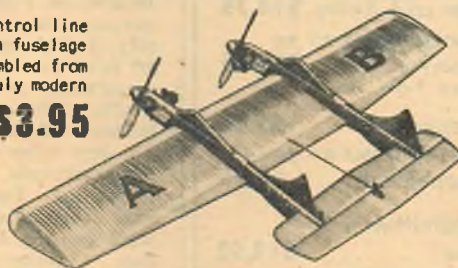
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shook his head. "It is the rule to have fifteen lessons first."

But I was adamant. I told him that I enjoyed his company but that I didn't need any more lessons. I wanted to fly alone. By this time, the crowd had developed an interest in the discussion. Soon, he was fighting it out with them and I was forgotten in the background. After a while, M. Lépense came over and the thing was explained to him. Finally they became quiet. A decision had been reached. M. Raymond turned to me. "You may try it alone," he said, "But it must be in an old machine, the Peste de Ciel."

This announcement created a stir in the crowd. "The Peste de Ciel!" they shouted. "Get out the Peste de Ciel!" In a few minutes, chuckling and talking excitedly, they dragged it out. It was a red single-seater, covered with dust, having no canopy over the cockpit and no spoiler flaps on the wings. They pushed it into position for the hook, strapped me into place; and took turns shaking hands with me. M. Raymond gave me some last-minute instructions: "No less than thirty-five kilometers for safe speed." Then, he too shook my hand. A little girl they called "Minus" came over and kissed me. I was ready.

They put the hook on and raised the signal for the winch operator—a black square on a long pole. Then . . . Attention! The signal was lowered and I lifted into the air as easily as a kite in a high wind. Everything seemed fine. I climbed steadily waiting for the hook to snap loose, keeping a finger on the release in case it didn't. I waited. My feet shook on the rudder pedals from

excitement. Suddenly, the Peste began to buck. It slammed up and down like a skiff against a heavy sea. The wings creaked and I thought I was going to lose them. Just as the hook snapped loose, the stick jerked out of my hand.

For a second, the machine hung motionless, nose high. Then it stalled. I let it dive to pick up flying speed, recovered control, circled the field and slide-slipped in for a landing. M. Raymond ran to greet me. I made a motion with my hand like a bucking bronco. "What happened?"

"Pardon," he shook his head in self-accusation. "I forgot to tell you. It is a disease of the type. One must force down over the winch."

I made several flights in the Peste that day taking her diseases into account. You had to lower her nose at the top of the tow. You had to glide her at a high speed to keep her from mushing down like a sick pelican. The Peste ignored upcurrents. She just kept going down and down. Soaring was not her forte. She wanted to get back into that hangar and sleep. I wanted nothing more to do with her.

In Versailles the next afternoon, I waited in vain for the Simca. It was late. I met Minus and one of the others. They too were waiting. We decided to phone the field. The phone call was, as usual, a project of grand proportions. After twenty minutes of broken connections and frenzied explanations, we learned that the Simca was in the garage for repairs. There were no buses for Beynes until evening.

Maddening! It was a perfect day for *vol à voile*; popcorn balls of cumulus cloud were floating in a clear blue sky.

It was too much to pass by. We decided to walk.

On the road to St. Cyr, we were picked up by the postman. He had to stop at several villages en route, but eventually, he said, he'd wind up at Beynes. For two hours, we sat on mail bags and rattled from one village to another. In each village, the same thing happened. The postmaster, who was generally also the grocer, would start toward the truck when it pulled up. He'd get about halfway to us when his wife would appear, brush him aside and pounce on the mail bags. In six seconds, she knew who was getting mail, who was getting packages, and, probably, what was in them.

Late in the afternoon, we arrived at the field. The sky was filled with planes. Conditions were perfect. Spotting M. Raymond, I ran toward him. "Quel beau temps!" I yelled. "I want to fly!"

"D'accord. It is done," he smiled, showing his bullets, "tout de suite." He turned toward the hangar: "Roll out the Peste!"

I refused to fly the Peste again. I wanted to climb into one of the cream-colored teardrops with the plastic hoods. A day like this was made for such a *planeur*.

After a brief conference with M. Lépense, M. Raymond helped me into a Mouche, showed me the brake and spoiler controls, and arranged to have me launched immediately.

The Mouche was delightful to fly. On the cable, it climbed quickly and effortlessly. It had a flat, clean glide, whispering as it flew. I saw some planes spiraling upward and headed for a posi-

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tion under them. The thermal current
lifting them also lifted me. At a thou-
sand meters, I climbed above them,
shouting as I passed. They waved and
shouted back.

Soon, the thermal gave out and I
headed south looking for another. Un-
derneath a cloud, I caught an updraft,
even stronger than the first, which bore
me higher. It was exhilarating. I
began to sing at the top of my lungs.
In a while, I ran out of songs. I wasn't
dressed for much altitude. Occasion-
ally, I shivered from the cold. After
an hour and a half, the clouds started
dissipating and, with them, the up-
drafts. The sun rested low on the
horizon. Evening was approaching.

I flew back to the field and circled,
losing altitude. I was the last one still
in the air. Down below, working like
ants dragging dead moths, the students
were putting the planes away for the
day. I pulled the spoiler handle, lost
my altitude, and softly touched her
down.

Everyone was enthusiastic about my
flight. They shook my hand and slapped
me on the back. M. Lepanse ran into
his office and came out with a little
blue medal with three white birds on
it—the coveted emblem of "C" license
for soaring flights. He pinned it on my
chest amid general applause. I was
really one of them now.

I asked for Mr. Raymond. Someone
pointed toward the office. There, I
found him, his pudgy body collapsed
in a chair, his face covered with bloody
scratches. "What altitude did you
achieve?" he asked, smiling faintly.

"My God!" I said. "Qu'y a-t-il? What
happened?"

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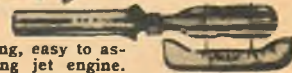
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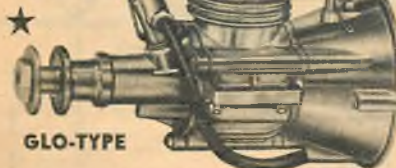
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"The risks of the profession." He waved a hand toward the door leading into the hangar. "Regardez."

I walked to the doorway and looked through. In the center of the floor was a mass of plywood splinters. Enough of it was left so that I could identify it as the dual machine in which I had taken my first flight with M. Raymond. "What happened to the student?"

"Slight damages to the legs. It is nothing." He told me the story. The elevator control cable inside the fuselage had snapped while he was taking off. Luckily, he was only a few meters off the ground. The wings had taken most of the shock.

Outside, the others shouted for me. The bus was ready to leave for Paris. Riding back, I conferred with myself. I had complete confidence in my skill as a pilot but control cables breaking was another matter. There was nothing to do when that happened but jump or crash. I was far from home with little money besides my G.I. allowance. If I cracked up, there was no gleaming white USN sick bay to take care of me the way there had been during the war. . . .

I went out to Beynes once again, but only to visit. That afternoon was pleasantly passed sitting in the sun and talking. Happily no one asked why I didn't fly. We all had wine and, when the bus was ready, took some bottles along for the ride. At the Place de l'Opera, we said goodbye. I descended into the Metro and headed toward Montparnasse and my American friends. Now, compared to the crowd in the bus, they seemed a moody, spiritless, earth-bound lot.

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Detroit, Mich., Annual State Exchange Clubs Model Aircraft Meet*

June 24 & 25 at Ford Test Field. Write to: H. J. Clemens, Aviation Chairman, Metropolitan Council of Exchange Clubs, 423 Penobscot Building, Detroit 26, Michigan.

New York City, Mirror Model Flying Fair*

June 11 at Grumman Airfield, Bethpage, Long Island. Write to: Director Mirror Model Flying Fair, New York Mirror, 235 East 45th St., New York 17, N. Y.

Oklahoma City, Oklahoma, Oklahoma City Regional Free Flight Meet

June 3 & 4 at Tulakes Airport. Write to: Ray Mathews, 3700 North Linn, Oklahoma City, Okla.

Washington, D. C., National Capital Model Airplane Show*

June 25 at Andrews Field. Write to: National Capital Model Air Show, Evening Star, Washington 4, D. C.

Other meets pending

*For the meets in Detroit, New York and Washington, to conform with established policy of contest sponsors, Pan American World Airways will offer trophies in lieu of the cash prizes announced in the PAA Load Event booklet "Rules and Specifications for 1950."

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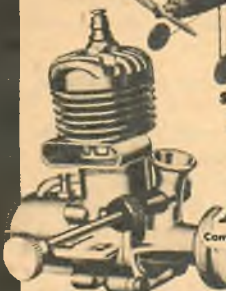
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Nifties

(Continued from page 54)

one-piece wing (it is better than 17 inches), formed with camber and dihedral, and printed in color (orange) on both sides, license letters and numerals being obtained by the simple process of leaving white or natural wood portions as necessary.

Both fuselage sides, as well as top and bottom, the landing gear legs, wing struts, and bulkheads are die cut. So are the tail surfaces. Fuselage and tail surfaces are printed solid yellow. Other parts include a plastic prop, and wheels and tail wheel, formed wire landing gear, shaped nose block, another colored shaped block for top of nose, and cut-out windshield in one piece including the side windows. There's a 1/8" rubber band for power and a hardwood nose button. A formed wire prop shaft requires only that the front end be bent and doubled back around the propeller hub.

Right off the bat, you get a vivid impression of where the Nifties will fit in. Look at it this way. There are several approaches to the flying scale kit (but at a price) for manufacturers. The first modern requirement is that assembly be made as automatic and as fool proof as the human mind can devise—and brother, the kit makers are doing some genuine devising these days. But after that, what? Kids love scale. But scale details must not mean too much work. That approach means great cost in providing finished detailed parts. How much do you give them—but how much can you charge? Flyability? That means strength, certain aerodynamic features (like a dihedral wing, which also costs the manufacturer extra), but reasonable weight.

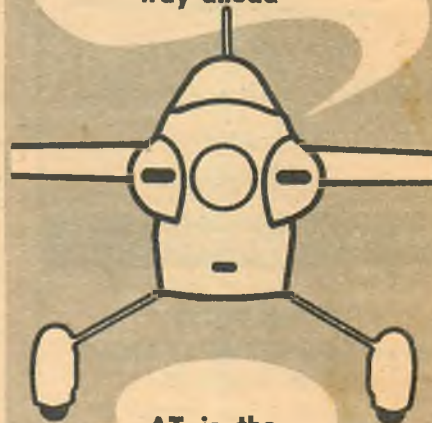
From where we sit it looks as if the Nifties lean toward the flying side. Why? Well, that wing for one thing. The lengthened landing gear—quite sturdy too; the design of the prop, with its wide blades, helical pitch, small hub. The prop reminds you of a contest prop, only in miniature, and in semi-transparent colored plastic.

Having assembled all four of the Nifties—one an evening—we were able to evaluate a number of the constructional features. There are four formers, each having a tab on the side which fits into slots that are die-cut in the fuselage sides. Since these slots are at different elevations of the fuselage profile, the formers give good alignment. The sheet wood covering of the top and bottom ordinarily could be expected to produce trouble at the forward, bottom curved section of the fuselage, but this difficulty was avoided by a number of score marks across the grain of the wood. (Material comes scored.) It makes the bend quite handily. The landing gear is strong, does not fail when the ship is hand glided to a wood floor; the one-piece formed wire cements to the forward edge of a bulkhead. The landing gear struts are then cemented to the wire and glued to the corner of the fuselage.

An indication on the wing enables the builder to locate it quickly, with equal span on both sides of the fuselage. The one point that requires care is the assembly of the wing support struts; rather, one just shouldn't be careless because forcing a strut into place can lift either the leading or trailing edge as the case may be, thus affecting the flight of the model.

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side profile, showing formers, balance point, and so on; and twelve steps in construction and assembly. Each step is shown in perspective, with brief but adequate directions.

"For four months all I did was eat, sleep, and think Nifties," says Jerry Brofman, at Enterprise's Brooklyn, N. Y., plant. "Every step was a problem to be solved. One of the biggest problems was having formulated a special printing ink that would print solid on balsa without raising the weight too much per square inch. We had to develop special machines that could manufacture and print every part on our own premises.

"The wing is formed automatically by a machine which took a month to design. Printing on both sides is easy—just like paper is printed, turn it over, but be careful of registration."

The four Nifties built for our tests were flown by the same methods that any flying scale model must follow to perk. Each was hand glided to determine fore and aft trim and, where necessary, pieces of solder (or clay) were attached to the nose for ballast. This is typical of any rubber flying scale due to the length of rubber which shifts the balance point to the rear. Enterprise uses scale outline stabilizers; larger but unsightly surfaces would partially alleviate the trimming. If the nose block sits squarely in place the model then will fly when hand wound. (Thrill seekers might try a winder for more duration.) Being old contest hounds and adjustment fiends from way back, the staff soon was up to old tricks of down thrust, and so on, so you can play around if you want to! The elevators may be bent to correct trim. All this appears on the plan.

The size of the Nifties and the sturdy fuselage construction bring up the possibilities of other forms of power. In fact, pylon flying from a standing start is excellent with a small CO₂ motor and, while it lasts, with the power of two or three rubber bands. Club contest in a meeting room could consist of five laps, everyone using the same tether and racing against a watch.

The fuselages will take anything up to an .074 Cub but the wings probably are too light to stand the strain. It would seem, however, that an Infant is not too powerful for the wings. For such round-the-ylon operations with a gas engine, it would be wise to follow the fundamentals listed by Frank Ehling in the August 1949 issue of A.T. The engine weight probably would provide the right trim for such flying—but remember to shorten the nose if the prop is to stay in scale position. A single line running through a wing guide would attach to the side of the fuselage at the center of gravity position. The rudder should be offset to the outside of the circle and the thrust line similarly inclined outwards. If necessary, a bit of weight could be attached to the underside of the outside wing.

In free flight the Nifties do fairly well. Under power they fly well, everything considered, but the glide is not too good due to the small elevator area. Since that area is scale, this merits allowance. Like the low price flying scales of other big-name manufacturers, the Nifties hold possibilities for any builder regardless of age. Many clubs have informal contests where members build the same make of kit. For individual activity any builder who has an itch to make something in a hurry certainly hasn't far to look. And they're really good for getting started.

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MINIATURES
35c

5 1/4" - 2"

5 1/4" - 3"

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6" - 2"

6" - 3"

6" - 4"

6" - 5"

6" - 6"

6" - 7"

6" - 8"

6" - 9"

6" - 10"

6" - 11"

6" - 12"

6" - 13"

6" - 14"

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Job in Aviation

(Continued from page 23)

jobs in the federal service are not to be overlooked. CAA airways patrol pilots number about 50; aviation safety agents who are pilots, number about 575; and piloting ability is not required, even though it is favored, in several other CAA jobs. All these CAA pilots must be top-notch. Many of them must be able to test and rate airline pilots as well as students, and they have long and varied aeronautical experience. There are pilots with the National Advisory Committee for Aeronautics, mostly that excellent combination of engineer-pilot so valuable in research work. The Department of Agriculture hires pilots, as does Interior, TVA, Public Health and Immigration. These agencies have 1,190 airplanes. All federal jobs, of course, are civil service.

CAA today has 17,492 employees, growing to this figure from 11,128 employees in 1946. Moreover, the CAA is in the third year of a highly successful practice of designating persons in the aviation industry to represent it and do what its agents cannot find time to do. In all, there are some 10,000 people in the industry acting for the CAA in serving the flying public. Considering the changeover of the 60,000 miles of federal airways to very high frequency facilities, and the construction and operation of a new and better air navigation system within the next 15 years, the CAA should not be overlooked either.

Today there are more than 200,000 employed in the aircraft plants scattered across the nation. As the per-

(Continued on page 93)

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Soaring

(Continued from page 12)

& Soaring Service School, Sanford, Fla., and soon found himself owner of four Laister-Kauffmann sailplanes. He holds the Silver "C" license.

Gliderport. One of the most active soaring groups operates out of the Wurtsboro, N. Y., Airport, 85 miles Northwest of New York City. The group consists of two glider clubs—the Metropolitan Soaring Corporation and the Airhoppers Gliding and Soaring Club—as well as several non-affiliated "private owner" soaring pilots. In their two and a half years of flying at Wurtsboro, these faithful fans have amassed a total of 800 hours' soaring time. Equipment consists of 11 sailplanes and two tow-planes. Best distance achieved from this field was 60 miles by Alan Schmid of the Pennsylvania Glider Council, during the last Columbus Day meet, and best altitude 7,800 feet by team of Alex Dawydoff & Emil Lehecka.

On this occasion Dawydoff and Lehecka wandered away from the airport and were obliged to land their Pratt-Read sailplane at the Stewart, N. Y., Air Force Base—to the horror of base personnel. Not being able to see an engine on the Pratt-Read when it came around on the base leg at 135 mph and emitting a loud whistling noise, the G. I.'s figured it for a jet. As the sailplane lit on its single wheel and came to rest with one wing on the ground—out came the ambulance, fire truck, the "Follow Me" jeep on mercy bent. The two soaring pilots explained it was a normal sailplane landing—except the 135 mph pattern!

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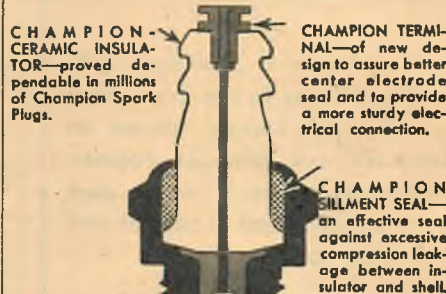
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THREAD LENGTH	7/16"	7/16"	7/16"
"V" GLOW PLUGS	VG-1	VG-2	VG-3
WEIGHT, GRAMS	8.7	3.7	2.8
"V" SPARK PLUGS	V	V-2	V-3
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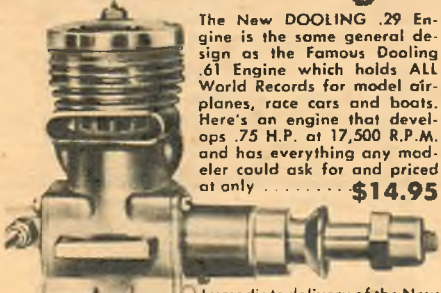
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PLYMOUTH INTERNATIONAL FOR AUGUST 14-21

Termed the "Olympic Games of model plane flying," Plymouth Motor Corp.'s Fourth International Model Plane Contest will be held at Detroit August 14 to 21, it was announced by D. S. Eddins, president of Plymouth.

Sanctioned by the Academy of Model Aeronautics and held in conjunction with the Aero Club of Michigan, this year's contest will offer \$7000 in U. S. Savings Bonds for prize winners in 40 events in addition to 120 first, second, and third-place trophies and seven perpetual trophies.

The contest will be invitational, with 500 of the top model builders in the United States, its possessions, and foreign countries competing. To be invited, modelers must establish outstanding records in the local and state contests sponsored by Plymouth dealers.

Model flyers striving for a week of flying and entertainment in Detroit should watch local papers for announcement of Plymouth dealer-sponsored meets in their vicinity.

"We expect the Fourth International Model Plane contest to be the finest event of its type ever attempted," Eddins said. "We at Plymouth have become very enthusiastic about model flying, and we hope to continue to provide contests of the caliber which will attract the leaders in this hobby throughout the world."

Eddins pointed out that "nearly a million and a half people participated in or attended Plymouth dealer-sponsored contests and the International at Detroit last year." In addition, he cited the "outstanding performance" of the contestants who set new world records for circular speed events and straight-line speed under regulations of the Federation Aeronautique Internationale, world governing body for all sporting aviation, in the 1948 Plymouth meets.

The competition will be open to all boys and girls from the youngest model builders up to and including those who have reached their twentieth birthday. Following Plymouth's plan to provide a constructive recreation for youth, the open class has been dropped from the Fourth International. Model flyers above the age of twenty may still fly in a special open class in state and local contests, but will not compete at Detroit.

"Most of the experienced model flyers we have talked with feel that the future of the hobby lies with the freshman group," Eddins explained. "They have urged us to make our meet the outstanding one for younger hobbyists, and we feel that they are right. Many of the veteran model plane builders have volunteered to help the youngsters along."

There will be several changes over previous years, Eddins said. Among the important additions will be team racing events, in which gas-powered control line planes pit their speed against each other in the same control circle. Because highly trained crews are necessary to handle the planes at pit stops for refueling, the team racing events will be limited to older contestants in the senior class.

Another change will be in the flying scale events. In other years, contestants could enter only a specific model, such as a replica of the Stinson Flying Station Wagon. This year the event will be open to any type flying scale model. The change was made to allow model builders who specialize in building other type flying scale models to put their favorite planes in open competition with some of the finest flying scale models ever built.

The International will feature 40 indoor and outdoor events. There will be events for rubber-powered indoor jobs, rubber and gas-powered free-flight models, tow-line gliders, gas and jet-propelled speed planes, team racing and flying scale.

Participation at Detroit will be open to boys and girls in three different age groups: Freshmen, 11 years or under, not yet 12; Junior, 12 to 15, but not yet 16; Senior, 16 to 20 but not yet 21.

Winners in each event will receive the following prizes: first place, a \$100 U. S. Savings Bond and a permanent trophy; second place, a \$50 U. S. Savings Bond and a permanent trophy; third place, a \$25 U. S. Savings Bond and permanent trophy.

Most coveted, however, are the replicas of the huge perpetual trophies, upon which the following winners will have their names engraved: high point winner in each the Freshman, Junior, and Senior class; the Plymouth trophy for top speed in the control line jet-propelled events; the Stinson trophy for most points in control line flying scale events, the Air Trails Magazine trophy for most points in control line stunt events; and the DeSoto People and Places Magazine trophy for high point winner among girl contestants. Each contestant will be awarded an inscribed plaque regardless of whether he wins an event.

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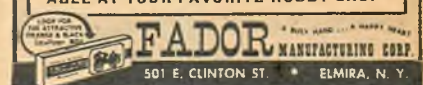
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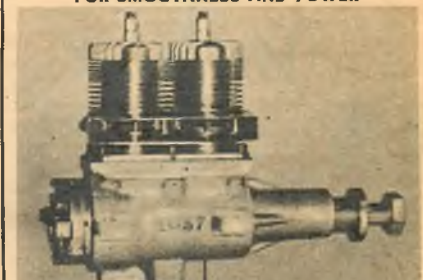
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ATLANTA GEORGIA

(Continued from page 90)
formance of fighters, bombers and transports rises, so does the demand for skilled technicians. Beside the aircraft electrician works now the electronics installer; the radio expert has been joined by the radar repairman. More complicated devices require thoroughly trained workers.

By-product jobs in the aviation field ought to be mentioned. The ANDB (Air Navigation Development Board) program will cost approximately \$1,100,000,000 over the next 15 years. This program consists largely now of development contracts let with manufacturers of airborne and ground electronics equipment. Many factories are busy in this program, or manufacturing equipment already developed for the program. Although these jobs may not be completely "aviation," they do have an immediate connection.

Work with fixed base operators at airports offers variety and close association with pilots, new planes, new developments of the game. It consists of such jobs as mechanics, instructors, pilots and general handymen around a field. At the end of the war in 1945, we had 4,026 airports. By July, 1949, we had increased that number to 6,443, with the Federal Aid Airport Program accounting for most of the rise.

Promising business for these fixed base operators is the growing activity in using the airplane in agriculture, and in spraying and dusting to destroy insect pests. Mosquito and fly control are needed in almost every part of the country; some crops in almost every state can be treated from the air; and the operator with initiative gets this business to supplement his "sustaining program" of servicing, selling and main-



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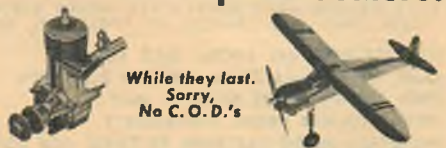
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Dope Can

(Continued from page 43)

winds up the rules. For an official copy you can write Lt. John H. Burton, USN, Acting Director of Special Activities, Office of Public Relations, Department of the Navy, Washington, D. C. (You'll need lots of ink in your pen for that one.)

Now about that high-speed, slow-speed difference—the greater it is the more points you amass. Two-speed engines immediately suggest themselves. A parachute out the tail? Okay, says the Navy. Flaps are tricky, of course, but might work well if combined with slots. If you use a device to increase lift, you'll have to slow down your engine; if you increase drag, you can use a single-speed motor set-up. Drag producers can include split rudders, panels on the fuselage that open out à la latest jet jobs, as well as chutes—one, or more.

Bill Effinger, known to some as Lt. William E. Effinger, Jr., USNR, reminds us of Jim Walker's intermittent two-speed control which enables Jim to hover his model (wow, that'd run up points!). Why not, asks Bill, build a canard with a reversible-pitch prop (which Walker also has) and fly ship 6 laps backwards as fast as you flew forward and get sum of two speeds instead of difference???

Then there's sure to be someone who suggests a jet or Jato unit, like the Jetex, which you face forward to cut down speed on the slow-speed laps. Time—and the Dallas Nats—will tell.

More Navy-Sponsored Flying. You think we're through with what the Navy is doing to advance aeromodeling? Listen. Another new National meet category will be the "U. S. Navy Radio-Controlled Model Airplane Event." Its objective: precision bomb drops from a model by remote control on a bull's-eye target. That target will be only two feet in diameter and you can't bomb it from below a 25-foot altitude. Any type or size r-c model can be used. You drop three bombs, singly or in salvo. Bombs can be carried inside model or ex-

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ternally. First bomb must get away by radio control, the other two may be released mechanically if desired.

Bomb length must be not less than half mean wing chord. They must resemble full-scale bombs and have stabilizing rings or fins. Take-off is unassisted ROG. If your model clears within 10 feet of launching point, you receive 100 points. For each additional foot of run required beyond 10, one point comes off the 100. Jato may be used.

Direct hits on bull's-eye bring 300 points per bomb. For every foot a bomb misses, you lose 20 points from the 300 possible. Landing must be made on or beyond a line. Within a foot you'll receive 100 points, for each additional foot beyond that they chop off 5 points from the 100. Contestants will have 5 minutes to get the model in the air after being called. Ten more minutes are given to make one or more flights. It'll be a fast 15!

Relative standing of each contestant for award purposes will be based on highest total point score for take-off, bombing run and landing during any one flight. For official set of rules write Lt. Burton at address given in foregoing item.

Navy Three-View Drawings. Even if you don't go to the Nationals and compete in the Navy's carrier and bombing events, you'll be interested in knowing that you can get official three-view drawings of Navy aircraft by writing Lt. Burton in Washington. Here are some of the plans available: North American XFJ-1 Fury, Douglas D558-1 Skystreak, Grumman XF8F-2 Bearcat, Douglas AD-2 Skyraider, Lockheed P2V-2 Neptune, McDonnell F2H-1 Banshee,

Martin AM-1 Mauler, and Grumman XF9F-2 Panther. Panthers, incidentally, will be flown by the Navy's crack Blue Angels stunt team during the Nationals.

These plans may be in short supply at the time you write the Navy, so ask for only the one or two planes you intend to build. Tell them you saw this notice in Air Trails, that'll help.

Free Show About to Begin. Hey, hey, step right up, folks, the main attraction is about to go on. We direct this to the special attention of club officers and program chairmen. The Shell Oil Company has a series of six 16-mm sound films on "How An Airplane Flies" which breaks down the theory of flight into its major components and makes each simple enough for even the layman to understand. The six films use animated diagrams, models and dramatic shots of actual planes in flight to tell the story of man's mastery of the sky. It's a crackerjack of a series and the films may be obtained on loan at no cost at one time, or you can order the films individually. Running time is as follows: "Lift," 12 minutes; "Drag," 14 minutes; "Thrust" and "Forces in Balance" are on one reel, total 14 minutes; so are "Stability" and "Controls," total 19 minutes. All your club does is pay return postage on films and fill out attendance card and send to Shell.

For those clubs clever enough to arrange an occasional non-aviation feature, Shell has some fine 16-mm color films in its "This Is Oil" series that include such titles as "Birth of an Oil Field," and "Harnessing Liquids—the principles of hydraulics made understandable." AND also available from the company is "Flight Log," which pre-

sents a running history of plane design from the Wright Brothers' first flight. It's a 20-minute black and white 16-mm sound film with Jimmy Doolittle as a featured "player."

Write your nearest Shell Oil Company office for information on these motion pictures. Clubs in Wash., Ore., Calif., Idaho, Nev., Utah, Ariz., western N. M., Mont. and Wyo.: 100 Bush St., San Francisco 6, Calif. Groups in eastern N.M., Texas, Okla., Ark. and La.: Shell Building, Houston 1, Texas. New England states, N. Y., Ohio, Pa., W. Va., Md., Del., N. J., D. C., Va., N. C., S. C., Ga., and Fla.: 50 W. 50th St., New York 20, N. Y. All other states: 624 S. Michigan Ave., Chicago 5, Ill.

Bisons Have Bite at Leonardos. Buffalo's Miniature Aircraft Engineers, better known as the Flying Bisons, held an election of officers and came up with Harry Keller as pres., Ron Kirk, veep; Bud Coomber, recording sec.; Norris Maltby, corresponding sec.; and Don Hobel, dues digger.

The club made what we consider to be an excellent change in its term of office. This has been extended so new elections will come at the opening of the fall season, which should promote a good opening meeting after the summer contest period. It will also put "fresh" men in office to bring the club through an uninterrupted series of seasons. A banquet was staged at Leonardos Restaurant to celebrate the elections. Turnout of members and their wives or gal friends was excellent and plans for future events discussed.

Smoke Patterns. We had some letters on the subject of smoke patterns for U-control

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While every precaution is taken to insure accuracy, we cannot guarantee against the possibility of an occasional change or omission in the preparation of this June, 1950, index.

stunt flying. At the moment we cannot suggest the source of smoke bombs which some fellows use, but we have succeeded in finding out that titanium tetrachloride has been used. It's purchased in liquid form from chemical supply houses and poured on a cloth held off from the outboard wing tip by wires. It smokes on contact with air. A few words of caution: its fumes are injurious to the eyes, so it should be used only in open air. Don't drop on clothing or skin. Most chemical houses will sell it only to those over 21. And they'll probably have some suggestions on storing and use that should be followed—but closely. Check your chemistry teacher if you're still in school and explain the problem to him or her. Maybe you'll uncover an entirely new (to modelers, that is) substance that can be used for smoke patterns. If you do, let Dopester know.

Publicity Minded Dealer. Many a hobby-craft retailer could take a leaf out of Milt Strober's notebook. Milt is the proprietor of Meteor Modelcraft, 1454 Flatbush Ave., where that tree grew—Brooklyn, N. Y. Milt, his store, his customers and their models got four pictures and almost half

the front page of the second section of a Sunday's "Brooklyn Eagle." It was a bang-up story that couldn't help but rouse an interest in hobbies on the part of Mr. Non-Modeling Reader. We suggest other dealers contact Milt and find out how he went about getting such a fine feature story set-up.

Thermal Thumbers Point System. Hal Roth, secretary of the famed Thermal Thumbers club of Los Angeles sends along some dope on the club's new system for determining high man for one or a series of contests. Before they started using the plan, the Thumbers had been following the old style: 100 points for a 1st, 80 for 2nd, 60 for 3rd, down to 10 points for 10th place.

New set-up takes the winning time and chalks it up as a 100% figure. Other performances are scaled downward in proportion to their percent of the winning time. Example—1st place time is 10 minutes, 2nd is 5 minutes. Should second place man receive 90 points? The club believes not, since his performance was only half that of the winner. According to their new system the Thermal Thumbers give that second place contestant 50 points. An imaginary winners' list would appear as follows, let us say: 1st,

10 min.; 2nd, 9:30; 3rd, 9:20; 4th, 9:00. Take the 4th place flyer, he obtained 90% of the winning time so he's entitled to 90 points instead of the usual 70 under the old scheme. Thus 1st gets 100 points, 2nd, 95 pts.; 3rd, 93 pts.; and 4th receives his 90 pts. Hal reports that the plan works well for every type of flying except indoor hand-launched gliders where there's usually tight grouping of winning times. For that the club suggests squaring all the flight times, then allocating points as per the above. Put in formula form, the Californians' system looks like this:

$$N = \frac{T_x}{T_1} (100)$$

where N is points, T_x is the time in question and T₁ is the first place time. The plan was evolved by Don James and will apply to all Thermal Thumbers meets this year.

Mouse and Rat Race. Up with some unique rules for team racing come the Western

CONTEST CALENDAR

May—Los Angeles, Calif., Thermal Thumbers Wakefield Contest, Hal Roth, 1869 Preston Ave.
May 14 & 21—2nd Annual Greenville, S. C., Model Meet. J. W. Scharpf, Exchange Club.
May 21—St. Paul, Minn., Talent Scout Meet. Lytton Calrow, 593 N. Snelling St.
May 21—Milwaukee, Wis., Record Trials, Aero-Modelers.
May 21—Bristol, Pa., Aeromodellers U-control meet. Clarence Wells, Box 51.
May 28—Pittsburgh, Pa., Control-liners Goodyear Meet. L. J. Stoutenburg, 100 So. 13th St.
May 28—Fresno, Calif., Record Trials. Ocie Randall, 716 Waterman St.
May 28—Akron, Ohio, Society of Model Plane Engineers Contest sponsored by Akron Women Chapter NAA.
May 27-30—Mid South Soaring Championship Contest (full scale) Dr. A. Raspet, Mississippi State College, Starkville.
May 27-30—Memorial Day Soaring Meet (full scale), Somerset, N. J., Airport. G. Scheurer, 33 Lexington Ave., Maplewood, N. J.
June 11—Pittsburgh, Pa., Control-Liner Meet. L. J. Stoutenburg, 100 So. 13th St.
June 11—Beckley, W. Va., 21st Contest Beckley Modelers.
June 11—Chicago, Ill., U-Liners Annual Open Contest.
June 11—Akron, Ohio, Society of Model Plane Engineers Contest sponsored by Akron Women Chapter NAA, Akron, Ohio.
June 18—Beloit, Wis., 4th Annual Thermal Dusters Contest.
June 17-18—Norfolk, Va., Middle Atlantic Championship Contest. S. Alfred Shoemaker, 211 Maycox Ave.
June 18—Bristol, Conn., Bell City Aeromodellers Invitation Meet.
June 25—Pittsburgh, Pa., Control-Liners Meet. L. J. Stoutenburg, Jr., 100 So. 13th St.
June 25—Fresno, Calif., Record Trials. Ocie Randall, 716 Waterman St.

Associated Modelers. Under title of "180 Lap Race Rules," the WAMers designate the Class A and B event as the "Mouse Race"; the Class C and D event as the "Rat Race." Field is laid out with a 10 ft. radius pilot's circle and a 20 ft. concentric circle. Distance between two is called the pilot's area.

Planes must have minimum spans as follows: A, 18 inches; B, 24 inches; C, 30 inches; D, 36 inches. Fixed landing gear; ships must ROG. If gear is damaged and plane can't take off or land properly, it must be repaired during race or entry is disqualified.

Line lengths are between 58 and 63 feet for the Mice; between 68 and 73 for the Rats. Line diameters are: A, .010 inch; B, .012 inch; C, .014 inch; and D, .016 inch. Each heat requires not 2, not 3, not 4, not 5, but 6 contestants. When plane comes in for servicing flyer moves out to pilot's area. Each entry must land and refuel at least three times during race.

For more data on the Mouse & Rat Race contact Harvey S. "Pop" Robbers, Sr., 5610 East 17th St., Oakland 3, Calif. It would amaze you to know how active the Western AM crowd is. They follow AMA rules generally, except they sanction their own meets and break down speed flyers into Beginner, Advanced and Expert Groups.

The California crowd—and the WAM includes clubs all the way down the state—have some good rules for exhibition scale U-control flying models, proto speed and team event racing. Well worth looking into, no matter where your club operates.

Twin-Fan Fan. Lawrence Miller, Norfolk, Va., sends along some snaps of a nifty P-38 powered by two O&R 23's. We wish the pix were better so we could have run them. He says he and Charlie Morton and Frank Birnbeck scaled up the ship and built it. Motors were first inverted, but fuel from intakes caught fire several times, so engines are now upright. Model makes realistic half-lap take-off and three-point landings. LM reports that it doesn't matter which engine cuts first since the ship flies well on either.

Some other items we would like to have known: span? length? weight? planked or paper covered? Ignition or glow? Details? When you send in news of your models, folks, please include all such information.

COMET'S CONTROL LINE IS COMPLETE!

3 COMPLETELY "PREFAB" MODELS USING THE VERY SMALL "GLO-PLUG" ENGINES!

The NEW ROOKIE Jr.

Here's the newest Comet Control Model using the very small "Glo-Plug" engines—and it's a "honey!" Scaled down from our big Rookie Trainer, the ROOKIE Jr. is a marvelous performer at a low price—and so completely pre-fabricated that even beginners can put it together in a few hours! Like the other two models in this Comet group, the ROOKIE Jr. can be flown in a small area with excellent results. It's a "star" in the sky—it'll be a "star" in sales!

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Scaled down from Megow's Flying Circus. Completely pre-fab stunt-type model. All these kits are unusually complete.

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Here's a top-notch performer with completely finished balsa wing; ready-cut fuselage sides and formers; 1-piece formed shockproof landing gear; shaped balsa tail pieces and plywood firewall. Wingspan 35½"; suitable for Class "A," "B" and small "C" engines.

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A marvel of simplicity and accuracy, a great performer, and an unusually complete U-control kit. For Class "B" and "C" engines.

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So completely prefabricated it reduces building time to the absolute minimum! Biggest value in the field! Wingspan 35½"; suitable for Class "A," "B" and small "C" engines.

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The new standard trainer of the Air Force.

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Here is the model of the "trainer" that cruises at 280 m.p.h. You will thrill yourself controlling your own model of it. Its tricycle landing gear gives velvet smooth take-offs and landings.

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"SWISHER"



"MINI-ZILCH"

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This stunt controler kit was designed for the midjet engines by Jim Saffig. It includes die-cut fuselage sides; ribs; plywood parts; wing and tail surfaces; full length spar; formed landing gear; wheels; and complete hardware for the "U-Control" system!

\$1.25



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Designed for quick easy construction, the fuselage is cut-out ready for assembly; leading and trailing edges are shaped and notched; and plywood parts and tail surfaces are die-cut; and the "U-Control" system, formed gear, rubber wheels; bolts; and bubble canopy are included!



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This beautiful model opens Team Racing to the owners of Class "A" engines. The complete kit includes a fully carved and hollowed fuselage; rubber wheels with metal hubs; shaped wing surfaces; metal landing gear; complete hardware, including the Walker "U-Control" system!

\$2.00

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TRANSMITTER: Stamped and formed chassis with all holes punched; all necessary electronic components; resistors, capacitors, coils and chokes ready for installation; keying switch, soldering lugs and hardware; plywood case, color coded wiring, plus the dipole antenna wire.

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